



## Monograph

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# A taxonomic revision of seed harvester ants of the *Tetramorium solidum* group (Hymenoptera: Formicidae) in southern Africa

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**Abstract.** Ants of the *Tetramorium solidum* group occur in Africa, with the vast majority of species endemic to the arid regions of southern Africa. The first revision of the genus was published more than 30 years ago and ant surveys have since considerably expanded the number of specimens available for study. The revision of this group reveals five new species, expanding the total number to 19. Almost all the species in this group occur in the southern parts of the Afrotropical region, with the exception of *T. setuliferum* Emery, 1895 and *T. rothschildi* (Forel, 1907). These two species have broad distributions within African grasslands and savannas, with *T. setuliferum* occurring in southern Africa and *T. rothschildi* in East Africa and the Sahel. Five new species are described in this revision: *T. aisha* sp. nov., *T. brigitteae* sp. nov., *T. duncani* sp. nov., *T. lerouxi* sp. nov. and *T. margueriteae* sp. nov. An illustrated key is presented and descriptions of new species are provided, supported by montage images and distribution maps.

**Keywords.** Ant taxonomy, arid regions, identification key, new species, systematics.

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## Introduction

The genus *Tetramorium* Mayr, 1855 is one of the most diverse and species-rich ant genera, with approximately 580 described species (Hita Garcia & Fisher 2015; Bolton 2017). It is distributed throughout most zoogeographical regions of the world but its highest diversity lies in the Afrotropical region, with about 250 described species (Bolton 1976, 1980, 1985; Hita Garcia *et al.* 2010a, 2010b, 2010c; Hita Garcia & Fisher 2013). Members of the *Tetramorium solidum* group are ground-nesting, seed-harvesting ants, mainly restricted to dry semi-desert areas of southern Africa. Two species in the group have a wider distribution and are found further north in Africa. Bolton (1980) revised the group and listed 14 species. Other than this revision, and the recording of particular species in various ant surveys (e.g., Robertson 2000; Parr *et al.* 2002; Netshiliphalala *et al.* 2005), very little has been published on the *Tetramorium solidum* group, despite the group's apparent ecological importance as seed harvesters in semi-arid habitats in southern Africa. In the 38 years since the revision of this group by Bolton (1980), ant surveys have considerably expanded the material available, which now provides an opportunity for a fresh perspective on this group.

In this paper we provide an updated taxonomic revision of the *Tetramorium solidum* group, including the description of five new species.

## Abbreviations of depositories

The material upon which this study is based is located and/or was examined at the following institutions:

AFRC	=	AfriBugs, Pretoria, South Africa
BMNH	=	The Natural History Museum, London, UK
CASC	=	California Academy of Sciences, San Francisco, USA
MCZC	=	Museum of Comparative Zoology, Cambridge, Massachusetts, USA
MHNG	=	Muséum d'Histoire naturelle de la Ville de Genève, Geneva, Switzerland
MNHN	=	Muséum national d'Histoire naturelle, Paris, France
MSNG	=	Museo Civico di Storia Naturale di Genova “Giacomo Doria”, Genova, Italy
NHMB	=	Naturhistorisches Museum, Basel, Switzerland
RMCA	=	Royal Museum for Central Africa, Tervuren, Belgium
SAM	=	Iziko South African Museum, Iziko Museums of South Africa, Cape Town, South Africa
SAMC	=	alternative for SAM
ZMHB	=	Museum für Naturkunde Berlin, Germany

## Material and methods

### Sample collection

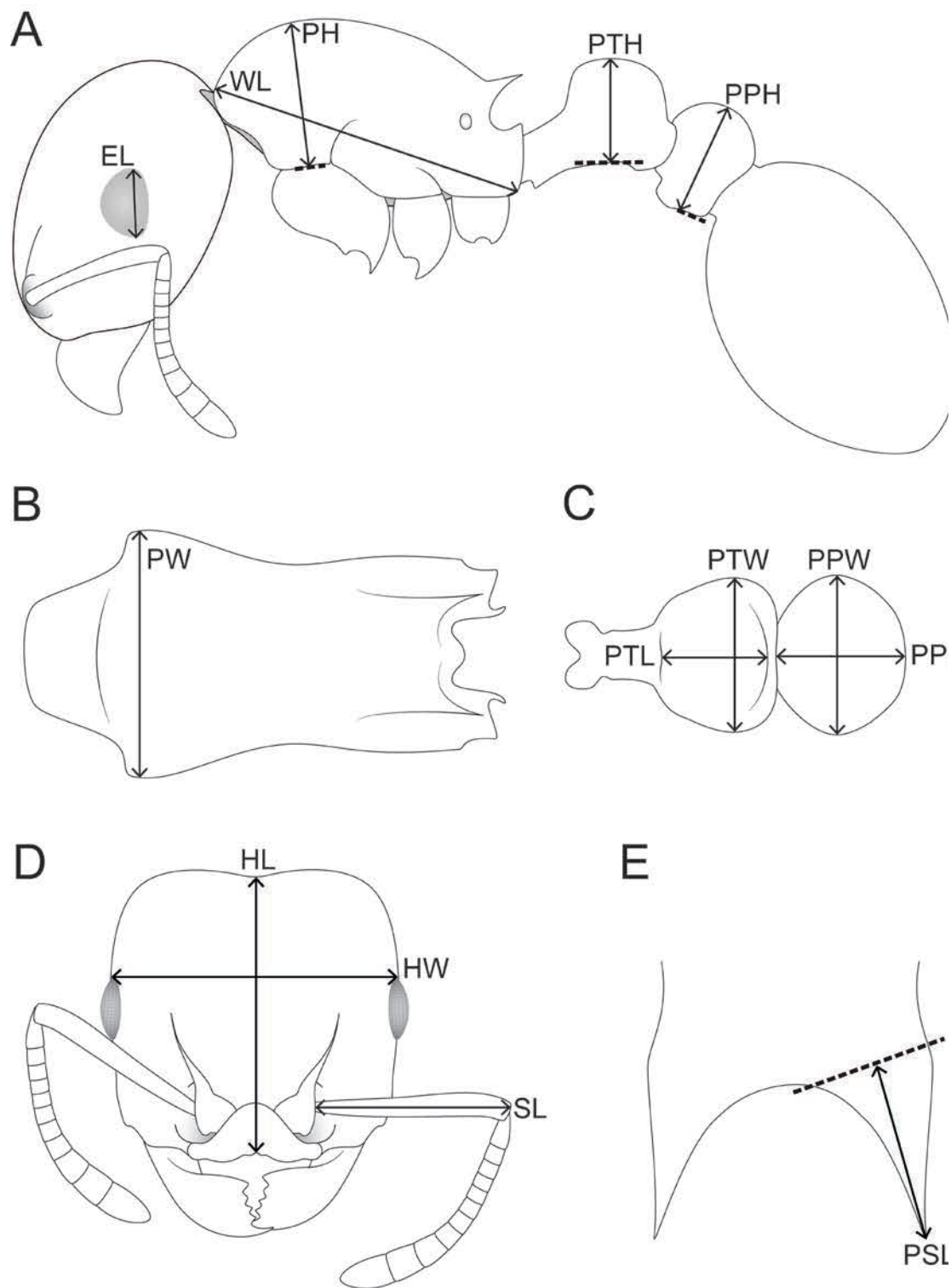
Specimens in the entomology collection at the Iziko South African Museum, Cape Town, were included in this study, along with further material loaned from the Natural History Museum in London, the California Academy of Sciences, Stellenbosch University and the consulting company AfriBugs (<http://www.afribugs.com>). Material was supplemented by specimens collected on field trips to the Northern Cape and Western Cape Provinces of South Africa, as well as Namibia. Ants were collected by hand, including digging up nests. Sampled ants were preserved in ethanol (96%), with representatives mounted and labelled for further study.

To visualize species richness and distribution, maps were produced for all the species in the *T. solidum* group by overlaying known point locality records onto ecoregional maps of southern Africa using QGIS desktop 2.8.1-Wien. All available occurrence records for species of the *T. solidum* group were extracted from the ant database of the Iziko Museums of South Africa. All records contained information on locality and year of collection, with some records having information on habitat.

**Morphological examination**

Raw images of most species were taken using an EntoVision multiple-focus imaging system in combination with the Leica Application Suite software (ver. 3.8), or with a Leica DFC450 and Leica Application Suite (ver. 4.1). Some species were not available for imaging, and in these cases photos were taken from AntWeb (<https://www.antweb.org>). AntWeb photos are marked as such in the figure captions. Morphological characters of adult workers were examined and measured using a Leica MZ16A stereo microscope, and all the measurements were taken with an ocular micrometer. The terminology used in this paper is based mainly on the morphological terminology of Bolton (1980). Measurements and indices used in this paper follow Hita Garcia & Fisher (2015). All measurements and indices are presented as minimum and maximum, and are expressed in millimetres, with arithmetic means in parentheses. Abbreviations of the measurements taken and ratios based on them are as follows (Fig. 1):

- CI = Cephalic index:  $HW/HL \times 100$   
 DMI = Dorsal mesosoma index:  $PW/WL \times 100$   
 DPel = Dorsal petiole index:  $PTW/PTL \times 100$   
 DPpI = Dorsal postpetiole index:  $PPW/PPL \times 100$   
 EL = Eye length: maximum diameter of the compound eye measured in oblique lateral view  
 HL = Head length: maximum distance from the midpoint of the anterior clypeal margin to the midpoint of the posterior margin of head, measured in full-face view; impressions on the anterior clypeal margin and the posterior head margin reduce head length  
 HW = Head width: width of the head directly behind the eyes measured in full-face view  
 LMI = Lateral mesosoma index:  $PH/WL \times 100$   
 LPeI = Lateral petiole index:  $PTL/PTH \times 100$   
 LPpI = Lateral postpetiole index:  $PPL/PPH \times 100$   
 OI = Ocular index:  $EL/HW \times 100$   
 PH = Pronotal height: maximum height of the pronotum measured in lateral view  
 PPH = Postpetiole height: maximum height of the postpetiole measured in lateral view from the highest (median) point of the node to the ventral outline; the measuring line is placed at an orthogonal angle to the ventral outline of the node  
 PPI = Postpetiole index:  $PPW/PTW \times 100$   
 PPL = Postpetiole length: maximum length of the postpetiole measured in dorsal view  
 PPW = Postpetiole width: maximum width of the postpetiole measured in dorsal view  
 PSL = Propodeal spine length: in dorsofrontal view the tip of the measured spine, its base, and the centre of the propodeal concavity between the spines must all be in focus; using a dual-axis micrometer the spine length is measured from the tip of the spine to a virtual point at its base where the spine axis meets orthogonally with a line leading to the median point of the concavity  
 PSLI = Propodeal spine index:  $PSL/HL \times 100$   
 PTH = Petiolar node height: maximum height of the petiolar node measured in lateral view from the highest (median) point of the node to the ventral outline  
 PTL = Petiolar node length: maximum length of the dorsal face of the petiolar node from the anterodorsal to the posterodorsal angle, measured in dorsal view excluding the peduncle  
 PTW = Petiolar node width: maximum width of the dorsal face of the petiolar node measured in dorsal view  
 PW = Pronotal width: maximum width of the pronotum measured in dorsal view  
 SI = Scape index:  $SL/HW \times 100$   
 SL = Scape length: maximum scape length excluding basal condyle and neck  
 WL = Weber's length: diagonal length of the metasoma in lateral view from the posteroventral margin of propodeal lobe to the anterior-most point of pronotal slope, excluding the neck



**Fig. 1.** Schematic line drawings of a *T. solidum* group species illustrating the used measurements. **A.** Body in profile with measuring lines for EL, WL, PH, PTH and PPH. **B.** Mesosoma in dorsal view with measuring line for PW. **C.** Petiole and postpetiole in dorsal view with measuring lines for PTL, PTW, PPL and PPW. **D.** Head in full-face view with measuring lines for HL, HW and SL. **E.** Dorsocaudal view of the propodeum with measuring line for PSL.

## Results

Order Hymenoptera Linnaeus, 1758  
Family Formicidae Latreille, 1809  
Subfamily Myrmicinae Lepeletier de Saint-Fargeau, 1835  
Tribe Crematogastrini Forel, 1893  
Genus *Tetramorium* Mayr, 1855

### Diagnosis of *T. solidum* species-group workers

The following diagnosis, which is based on Bolton (1980), distinguishes the group from all other groups in the Afrotropical region: relatively large *Tetramorium* (HW 0.875–1.279 mm, WL 0.915–1.498 mm) with very well-developed, massively constructed heads (HW > 0.80 mm and in most cases exceeding 1.00 mm) equipped with strong mandibles; 12-segmented antennae; anterior clypeal margin with deep and wide median indentation, sometimes occupying half of the anterior clypeal margin, except for *T. barbigerum* Bolton, 1980, in which it is more shallowly impressed; large eyes (OI 24–26); frontal carinae absent or very short, if present ending before anterior eye level; frontal scrobes absent; ventral face of head (usually) with J-shaped ammocheate hairs; base of first gastral tergite always sculptured, even if weakly so.

### Overview of species of *Tetramorium solidum* group

The species of the *Tetramorium solidum* group can be distinguished from other groups of *Tetramorium* by the presence of a median notch or impression on the anterior clypeal margin, which is often broad and deeply indented, combined with the presence of ammocheate hairs on the ventral side of the head (Bolton 1980). Bolton (1980, 1985) grouped species of the *T. solidum* group into three complexes based on the form of their pilosity. The first complex comprises *T. dichroum* Santschi, 1932, *T. peringueyi* Arnold, 1926 and *T. rothschildi* (Forel, 1907). These three species are characterized by the presence of abundant hairs on the dorsal surfaces of the head and body; these hairs are branched in *T. rothschildi* and simple in the other two species. The second complex includes *T. clunum* Forel, 1913, *T. galoasanum* Santschi, 1910 and *T. setuliferum* Emery, 1895; they all lack erect hairs on the dorsal surface of the antennae, mesosoma, petiole, postpetiole and first gastral tergite. They have a bizarre pilosity, which consists of short, broad, blunted, flattened and strongly appressed glittering silvery hairs. The third complex consists of *T. barbigerum*, *T. glabratum* Stitz, 1923, *T. grandinode* Santschi, 1913, *T. jordani* Santschi, 1937, *T. pogonion* Bolton, 1980, *T. rufescens* Stitz, 1923, *T. signatum* Emery, 1895 and *T. solidum* Emery, 1886, in which the body is hairless, or nearly so. Only *T. solidum* has a few hairs on the mesosoma (Bolton 1980).

### Synopsis of species of the Afrotropical region

*Tetramorium aisha* Mbanyana, Robertson & Hita Garcia sp. nov.  
*Tetramorium barbigerum* Bolton, 1980  
*Tetramorium brigitteae* Mbanyana, Robertson & Hita Garcia sp. nov.  
*Tetramorium clunum* Forel, 1913  
*Tetramorium dichroum* Santschi, 1932  
*Tetramorium duncani* Mbanyana, Robertson & Hita Garcia sp. nov.  
*Tetramorium galoasanum* Santschi, 1910  
*Tetramorium glabratum* Stitz, 1923  
= *Tetramorium solidum* st. *glabratum* Stitz, 1923  
= *Tetramorium solidum* race *glabratum* var. *aciculatum* Stitz, 1923 [name unavailable]  
= *Tetramorium rutilum* Prins, 1973  
*Tetramorium grandinode* Santschi, 1913  
= *Tetramorium grandinode* var. *hopensis* Forel, 1914

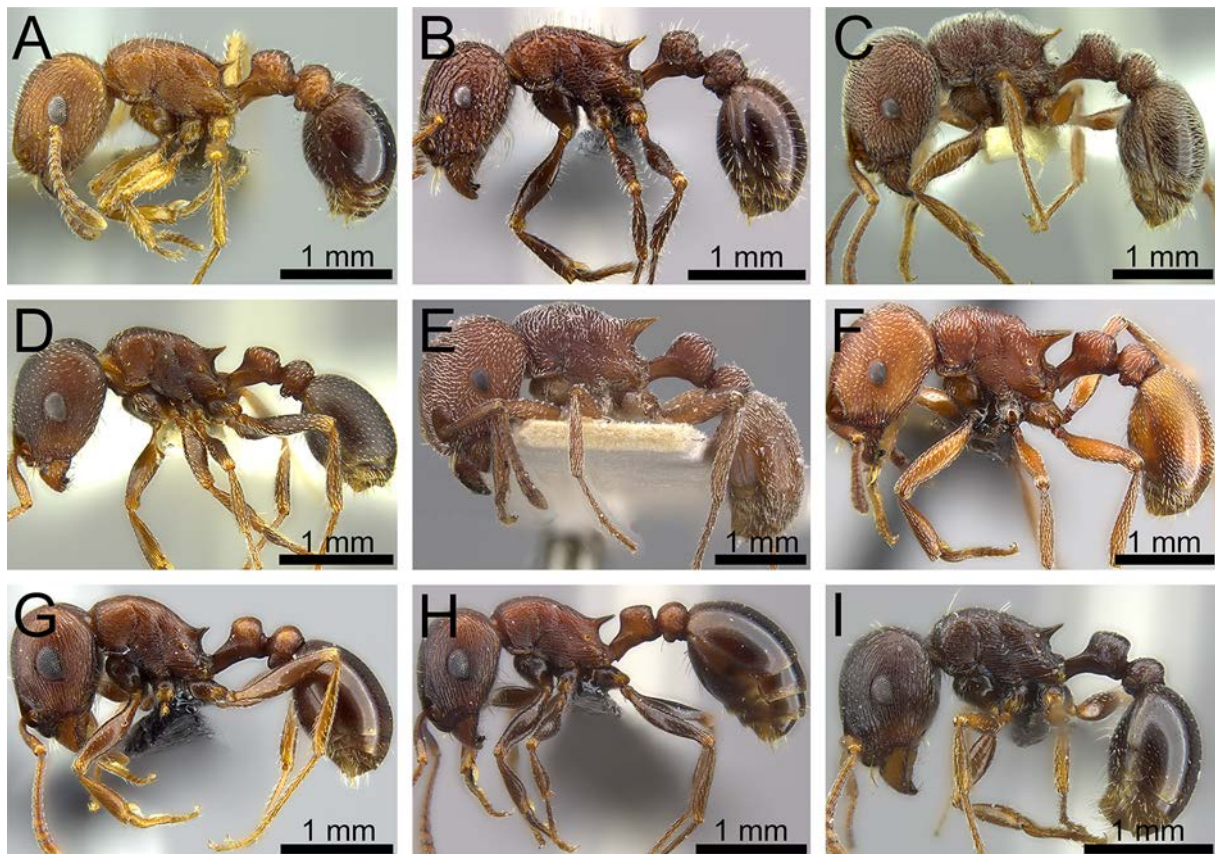


- Tetramorium jordani* Santschi, 1937  
 = *Tetramorium aspinatum* Prins, 1973  
*Tetramorium lerouxi* Mbanyana, Robertson & Hita Garcia sp. nov.  
*Tetramorium margueriteae* Mbanyana, Robertson & Hita Garcia sp. nov.  
*Tetramorium peringueyi* Arnold, 1926  
*Tetramorium pogonion* Bolton, 1980  
*Tetramorium rothschildi* (Forel, 1907)  
*Tetramorium rufescens* Stitz, 1923  
 = *Tetramorium solidum* st. *rufescens* Stitz, 1923  
*Tetramorium setuliferum* Emery, 1895  
 = *Tetramorium squamiferum* Forel, 1894 [name unavailable]  
 = *Tetramorium setuliferum* var. *cucalense* Santschi, 1910  
 = *Tetramorium setuliferum* var. *triptolemus* Arnold, 1917  
*Tetramorium signatum* Emery, 1895  
 = *Tetramorium solidum* var. *signatum* Emery, 1895  
 = *Tetramorium solidum* subsp. *lugubre* Forel, 1910  
 = *Tetramorium solidum* var. *grootensis* Forel, 1913  
 = *Tetramorium solidum* var. *tuckeri* Arnold, 1926  
*Tetramorium solidum* Emery, 1886

#### Identification key to species in the *Tetramorium solidum* group (workers)

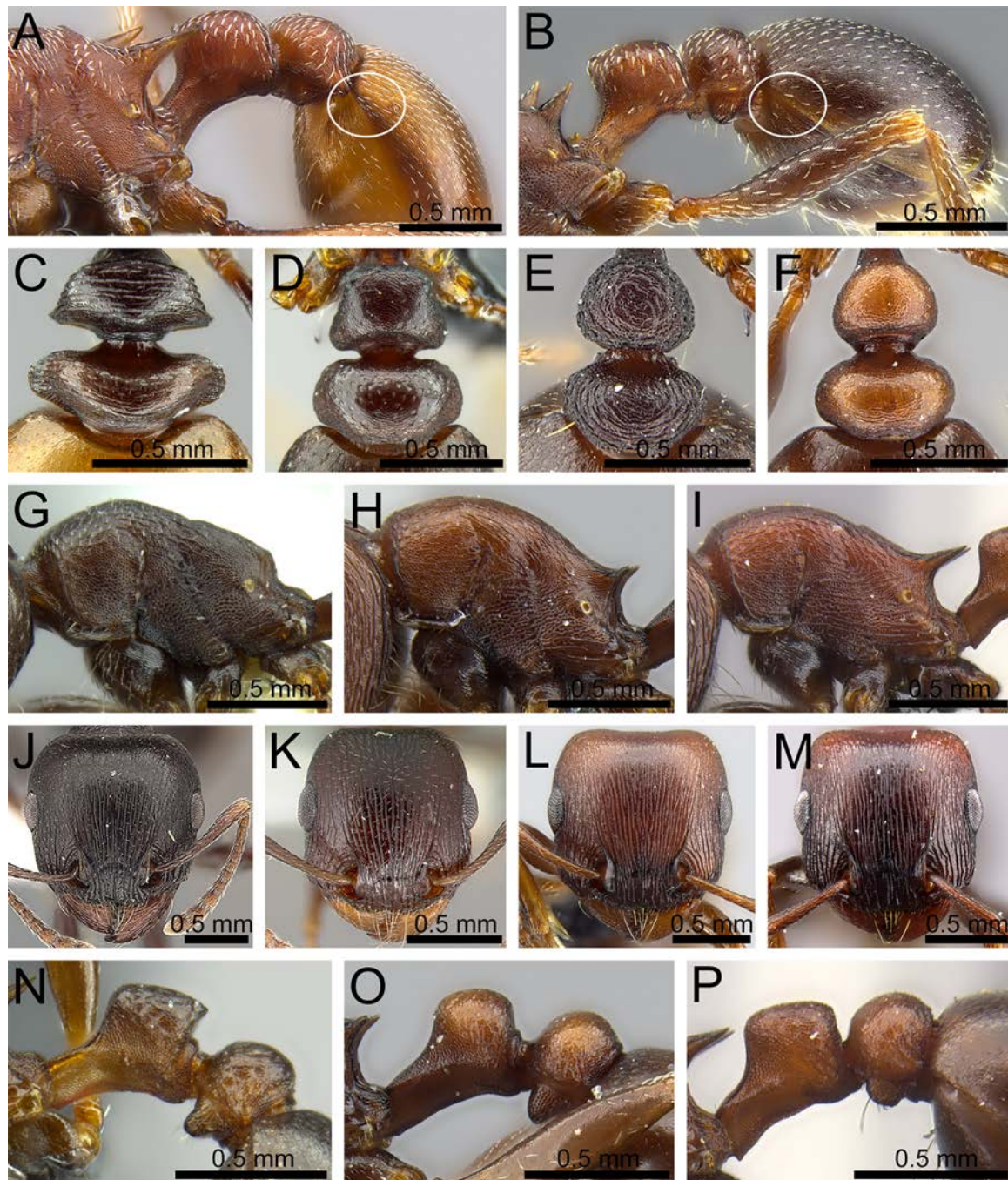
1. Body with branched pilosity (Fig. 2C) ..... *T. rothschildi* (Forel, 1907)  
 – Body either lacking pilosity or with simple pilosity (Fig. 2A–B, D–I) ..... 2
2. Dorsum of mesosoma in profile without any erect hairs, with appressed pubescence only (Fig. 2D–H) ..... 3  
 – Dorsum of mesosoma in profile with erect hairs (Fig. 2A–B, I) ..... 14
3. Body with short, broad, blunt, much flattened and strongly appressed glittering silvery hairs (Fig. 2D–F) ..... 4  
 – Body without such hairs, only with sparse simple appressed pubescence (Fig. 2G–H) ..... 6
4. Appressed pubescence long, dense and strap-like, hairs often overhanging one another (Fig. 2E) ..... *T. galoasanum* Santschi, 1910  
 – Appressed pubescence sparse and spaced out, not strap-like and not overlapping (Fig. 2D–E) ... 5
5. The base of the first gastral tergite in profile forming a thick, laterally projecting down-curved flange, which obscures the tergo-sternal suture basally and base of the sternite; reddish-brown or red species (Fig. 3A) ..... *T. setuliferum* Emery, 1895  
 – The base of the first gastral tergite in profile not projecting as above, the tergo-sternal suture and base of the sternite clearly visible; blackish brown to black species (Fig. 3B) ..... *T. clunum* Forel, 1913
6. In dorsal view both waist segments much broader than long and transverse, especially postpetiole extremely broadened with very well developed alar extensions making it approximately as broad as pronotum (Fig. 3C) ..... *T. grandinode* Santschi, 1913  
 – Waist segments, especially the postpetiole never shaped as above; if postpetiole with small alar extensions, then petiole not broadened (Fig. 3D–F) ..... 7
7. Propodeum unarmed, lacking propodeal spines (Fig. 3G) ..... *T. jordani* Santschi, 1937  
 – Propodeum armed with a pair of spines (Fig. 3H–I) ..... 8

8. Petiole in dorsal view broadened with lateral extensions on the sides (Fig. 3D) .....  
.....*T. lerouxi* Mbanyana, Robertson & Hita Garcia sp. nov.  
– Petiole in dorsal view without any lateral extensions as above (Fig. 3E–F) .....9
9. In full-face view head narrower in front of eyes than behind eyes (Fig. 3J) .....  
.....*T. barbigerum* Bolton, 1980  
– In full-face view head broader in front of eyes than behind the eyes, or same width (Fig. 3K–M) ...10
10. In profile posterodorsal corner of petiolar node sharply angled and slightly projecting posteriorly (Fig. 3N) .....*T. duncani* Mbanyana, Robertson & Hita Garcia sp. nov.  
– In profile posterodorsal corner of petiolar node rounded or rectangular but not sharply angled as above (Fig. 3O–P) .....11
11. Head broader in front of eyes than behind eyes (Fig. 3K) .....*T. pogonion* Bolton, 1980  
– Head same width in front of eyes as behind eyes (Fig. 3L–M) .....12
12. Dorsum of mesosoma completely longitudinally or irregularly rugulose/rugose (Fig. 4A) .....  
.....*T. signatum* Emery, 1895  
– Dorsum of mesosoma either predominantly shiny with only superficial punctate sculpture, or densely reticulate punctate, often with few faint longitudinal costulae, median area of mesosoma usually very weakly sculptured (Fig. 4B) .....13



**Fig. 2.** Body in profile showing pilosity and pubescence. **A.** *T. dichroum* Santschi, 1932 (CASENT0746320). **B.** *T. peringueyi* Arnold, 1926 (CASENT0250873). **C.** *T. rothschildi* (Forel, 1907) (CASENT0764434). **D.** *T. clunum* Forel, 1913 (CASENT0764600). **E.** *T. galoanasum* Santschi, 1910 (CASENT0915015 – Antweb, William Ericson). **F.** *T. setuliferum* Emery, 1895 (MCZ\_ENT00512567). **G.** *T. glabratum* Stitz, 1923 (SAM-HYM-C024395). **H.** *T. rufescens* Stitz, 1923 (CASENT0250852). **I.** *T. solidum* Emery, 1886 (CASENT0250960).

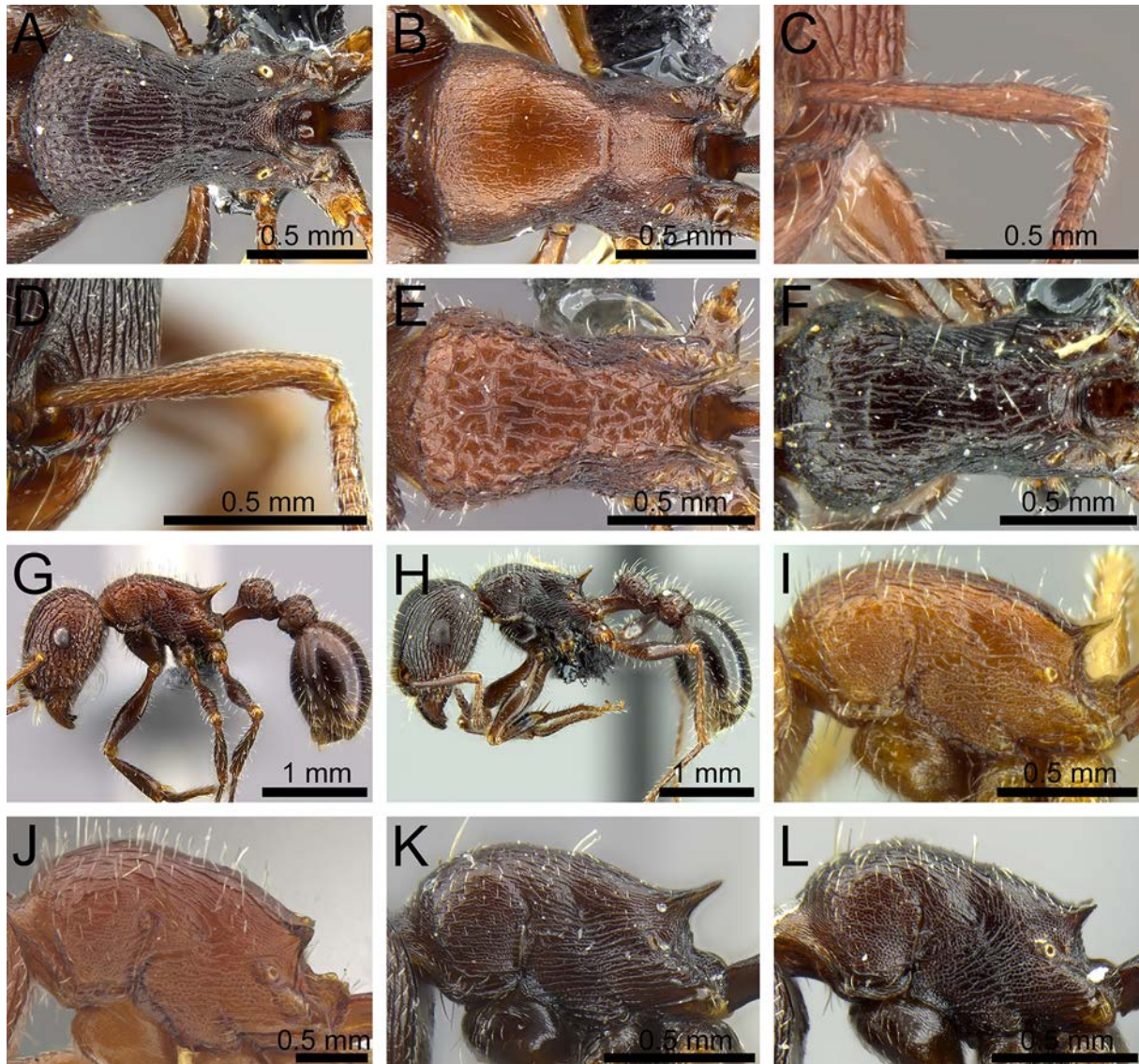




**Fig. 3.** A–B. Waist segments and gaster oblique lateral view. A. *T. setuliferum* Emery, 1895 (MCZ\_ENT00512567). B. *T. clunum* Forel, 1913 (CASENT0764600). C–F. Waist segments in dorsal view. C. *T. grandinode* Santschi, 1913 (CASENT0764655). D. *T. lerouxii* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C023329). E. *T. signatum* Emery, 1895 (SAM-HYM-C020573). F. *T. glabratum* Stitz, 1923 (SAM-HYM-C024395). G–I. Mesosoma in profile. G. *T. jordani* Santschi, 1937 (CASENT0248475). H. *T. glabratum* (SAM-HYM-C024395). I. *T. rufescens* Stitz, 1923 (CASENT0250852). J–M. Head in full-face view. J. *T. barbigerum* Bolton, 1980 (CASENT0901181). K. *T. pogonion* Bolton, 1980 (CASTYPE13390 – Antweb, photographer unknown). L. *T. glabratum* (SAM-HYM-C024395). M. *T. rufescens* (CASENT0250852). N–P. Waist segments in profile. N. *T. duncani* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C027003). O. *T. glabratum* (SAM-HYM-C024395). P. *T. rufescens* (CASENT0250852).



13. Propodeal spines short, broad and acute apically (PSLI 4–8) (Fig. 3H) ...*T. glabratum* Stitz, 1923  
 – Propodeal spines long and narrow (PSLI 16–23) (Fig. 3I) .....*T. rufescens* Stitz, 1923
14. Abundant erect hairs on all dorsal surfaces of head and body (Fig. 2D–E) .....15  
 – Only one to four pairs of hairs present on dorsum of mesosoma (Fig. 2L) .....18
15. Antennal scapes with erect hairs (Fig. 4C) .....16  
 – Antennal scapes without erect hairs, only with flattened pubescence (Fig. 4D) .....17



**Fig. 4.** A–B. Mesosoma in dorsal view. A. *T. signatum* Emery, 1895 (SAM-HYM-C020573). B. *T. glabratum* Stitz, 1923 (SAM-HYM-C024395). C–D. Antennal scape in frontal view. C. *T. aisha* Mbanyana, Robertson & Hita Garcia sp. nov. (CASENT0250969). D. *T. peringueyi* Arnold, 1926 (SAM-HYM-C026796). E–F. Mesosoma in dorsal view. E. *T. peringueyi* (CASENT0250873). F. *T. margueriteae* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-NC07-012). G–H. Body in profile. G. *T. peringueyi* (CASENT0250873). H. *T. margueriteae* sp. nov. (SAM-HYM-C019839). I–L. Mesosoma in profile. I. *T. dichroum* Santschi, 1932 (CASENT0746320). J. *T. brigitteae* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C027040). K. *T. solidum* Emery, 1886 (CASENT0250960). L. *T. aisha* sp. nov. (CASENT0250969).

16. Dorsal surface of mesosoma with strongly developed irregular reticulate sculpture; colour orange (Fig. 4E, G) ..... *T. peringueyi* Arnold, 1926  
– Dorsal surface of mesosoma with short longitudinal rugulae; ground sculpture mainly smooth and shiny with peripheral patches of fine, superficial reticulations; colour uniformly black (Fig. 4F, H) ..... *T. margueriteae* Mbanyana, Robertson & Hita Garcia sp. nov.
17. Propodeum armed with acute spines (PSLI 10–16); colour light brown, with gaster a little bit darker compared to mesosoma (Fig. 4I) ..... *T. dichroum* Santschi, 1932  
– Propodeum with short propodeal teeth (PSLI 6); colour reddish brown, with gaster black (Fig. 4J) ..... *T. brigitteae* Mbanyana, Robertson & Hita Garcia sp. nov.
18. Propodeum with elongate and acute spines (PSLI 17–21) (Fig. 4K) .... *T. solidum* Emery, 1886  
– Propodeum with short triangular teeth (PSLI 5–9) (Fig. 4L) .....  
..... *T. aisha* Mbanyana, Robertson & Hita Garcia sp. nov.

### Review of Species

In this study, we provide species descriptions of new species only. The descriptions for the remainder of the species are given in Bolton (1980). Where possible, vegetation habitat of a species is listed under the Remarks section. Biomes are in accordance with Mucina & Rutherford (2006) and include Fynbos, Succulent Karoo, Desert, Nama Karoo, Grassland and Savanna. The first letters of words that refer to specific vegetation types that are listed in Mucina & Rutherford (2006) are capitalised.

*Tetramorium aisha* Mbanyana, Robertson & Hita Garcia sp. nov.

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Figs 4D, L, 5, 24

### Diagnosis

Morphologically, *T. aisha* sp. nov. is similar to *T. solidum* in that these are the only species in the group with sparse simple erect hairs that are restricted to the mesosoma and petiole only. They can be separated on the basis of the length of the propodeal spines: in *T. aisha* sp. nov., the propodeum is only armed with very short propodeal teeth (PSLI 5–9) (Fig. 4L), which are shorter than their basal width, whereas in *T. solidum* the propodeum is armed with elongate and acute spines (PSL 0.157–0.197) (Fig. 4K).

### Etymology

Named after Aisha Mayekiso, one of the collectors, who is a Collections Manager (Entomology) in the Natural History Collections Department of the Iziko Museums of South Africa.

### Material examined

#### Holotype

SOUTH AFRICA: worker, Western Cape, Abrahamskraal, 32.92560° S, 22.01319° E, 516 m a.s.l., flood plain of dry river bed with *Salsola aphylla* and *Acacia karoo*, in deep finely grained soils, 15 Apr. 2008, N. Mbanyana, A. Mayekiso and H.G. Robertson leg. (SAM-HYM-C020292).

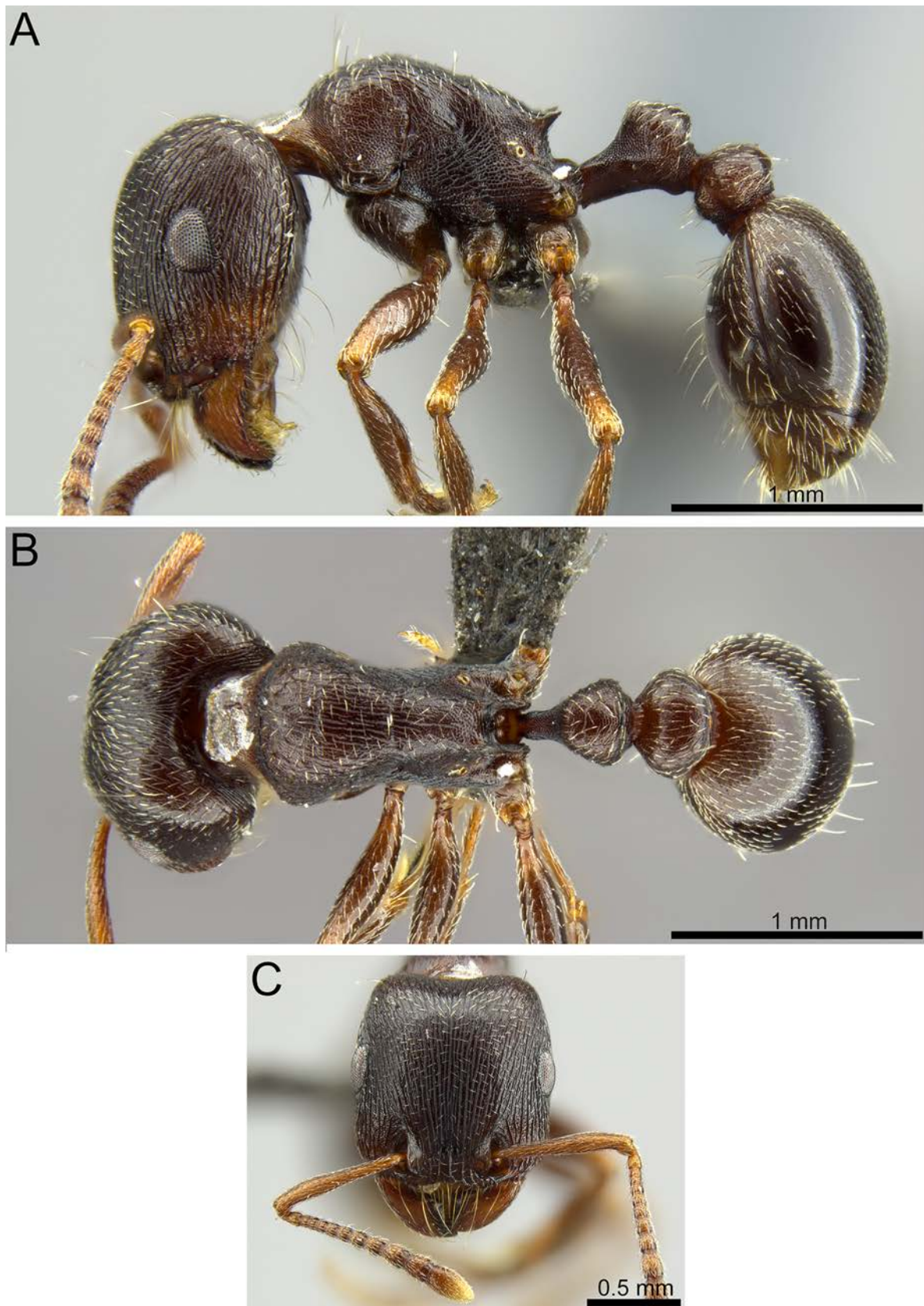
#### Paratypes

SOUTH AFRICA: 12 pinned workers, same collection data as for holotype (SAM-HYM-C020288 to SAM-HYM-C020292, SAM-HYM-C020316, SAM-HYM-C020329).

#### Other material

SOUTH AFRICA (29 pinned specimens): **Northern Cape**: Melton Wold, 31.46741° S, 22.72155° E, 1333 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023306, SAM-





**Fig. 5.** *Tetramorium aisha* Mbanyana, Robertson & Hita Garcia sp. nov. (CASENT0250969). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.



HYM-C023313); Sakrivier, 23 Apr. 1963, A.J. Prins leg. (SAM-HYM-C019290); Onder-downs, 24 Apr. 1963, A.J. Prins leg. (SAM-HYM-C019306); Kortkop farm near Strydenburg, 30°09' S, 23°44' E, pitfall trap, Karoo vegetation, 17 Jun. 1995, B. Chambers leg. (SAM-HYM-C008783); Hopetown Municipal Farm, 4 km E of Hopetown, 15 Feb. 1997, B. Chambers leg. (SAM-HYM-C010847); Prieska, 2 mi. from Prieska to Canarvon, 23 Oct. 1963, A.J. Prins leg. (SAM-HYM-C015044). – **Western Cape:** 36 km from Prince Albert on Leeu Gamka road, 32°54' S, 21°59' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009335); 21 km from Prince Albert on Leeu Gamka road, 33°02' S, 22°00' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009336).

NAMIBIA (3 pinned specimens): Klein-Aus Vista, 26°39.198' S, 16°14.542' E, 1273 m a.s.l., 4 Apr. 2011, in rocky sandy soil in the middle of dry riverbed, nest entrance with crater of soil around, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C026799); Erongo, Swakopmund, Central Namib Desert 2010 site 20, 22.92214° S, 15.20903° E, 572 m a.s.l., hand collected, 26 Oct. 2010, P. Hawkes, J. Fisher, J. Irish and R. Scholtz leg. (AFRC: CASENT0250969).

#### Measurements (workers N=13)

HL 0.993–1.082(1.037); HW 1.023–1.082 (1.060) SL 0.718–0.787 (0.764); EL 0.236–0.275 (0.262); PH 0.393–0.580 (0.474); PW 0.639–0.738 (0.673); WL 1.013–1.208 (1.102); PSL 0.049–0.089 (0.070); PTH 0.305–0.364 (0.335); PTL 0.246–0.328 (0.277); PTW 0.305–0.364 (0.338); PPH 0.375–0.384 (0.356); PPL 0.256–0.344 (0.284); PPW 0.393–0.482 (0.436); OI 22–26 (25); CI 100–108 (102); SI 68–74 (72); DMI 56–68 (61); LMI 33–53 (43); PSLI 5–9 (7); PeNI 47–52 (50); LPeI 75–93 (83) DPeI 108–132 (122); PpNI 61–70 (65); LPpI 64–100 (80); DPpI 131–180 (154); PPI 126–133 (129).

#### Description

##### **Holotype** (worker)

Mandibles with fine longitudinal striations. Anterior clypeal margin with extensive, semicircular indentation. Frontal carinae extending back from frontal lobes as fine ridges ending approximately at level of anterior eye margin. Propodeum armed with pair of short triangular teeth (PSLI 5–9). Metapleural lobes low and rounded. Peduncle with prominent keel-shaped subpetiolar process. Petiolar node in profile nodiform, with posterior face slightly more steeply angled than anterior face; anterior face also rounding into dorsum but with slightly angled corners as seen in dorsal view. Postpetiolar node low and rounded. Dorsal surfaces of head and mesosoma with finely reticulate ground sculpture overlain by longitudinal striations. Petiolar and postpetiolar nodes with fine reticulate sculpture overlain by irregular transverse striations. First gastral tergite with fine, superficial reticulate pattern. Numerous long hairs on clypeus. Ventral surface of head with prominent psammophore. Erect hairs distributed as follows elsewhere: dorsum of head with four pairs; dorsum of mesosoma with three pairs (two on humeri and one on mesonotum); one pair on petiolar node; and numerous hairs on first gastral sternite. Colour uniformly black.

Paratypes and other material examined similar to holotype, except for following differences: three to five pairs of long erect hairs on dorsum of mesosoma, arranged as follows; two to four pairs along anterior margin of pronotum and one pair on the mesonotum.

#### Distribution

Known from South Africa (Western Cape and Northern Cape) and Namibia, where it occurs in Nama Karoo, Montane Fynbos, Renosterveld, Kalahari Xeric Savanna and Namib Desert.

***Tetramorium barbigerum* Bolton, 1980**  
Figs 3J, 6

*Tetramorium barbigerum* Bolton, 1980: 243.

**Diagnosis**

*Tetramorium barbigerum* is easily distinguished from all species of the *T. solidum* group by its head shape, which is narrower in front of the eyes than behind (Fig. 3J). Morphologically, this species is similar to *T. jordani* and *T. signatum* in that they are all black in colour and lack erect hairs on the mesosoma, but the sculpture in *T. signatum* is much stronger developed compared to *T. jordani* and *T. barbigerum*. *Tetramorium barbigerum* and *T. jordani* have a feeble cephalic sculpture, fading out at the level of the eyes and replaced by a fine superficial punctation (Figs 6C, 14C). These two species can be easily distinguished from each other by the lack of propodeal spines/teeth in *T. jordani* (PSLI 1–2) (Fig. 3G) and the presence thereof in *T. barbigerum* (PSLI 7–8) (Fig. 6A).

**Material examined**

**Holotype**

NAMIBIA: worker, 10 mi. (16 km) W of Okombahe, 920 m a.s.l., 10 May 1958, R.E. Ross and R.E. Leech leg. (CASC: CASTYPE13386).

**Paratypes**

NAMIBIA: 17 pinned workers, same data as holotype (CASC: CASENT0270787 to CASENT0270792); 3 pinned workers, same data as holotype (BMNH).

**Measurements** (workers N=6)

HL 1.214–1.266(1.244); HW 1.201–1.240 (1.223) SL 0.827–0.891 (0.857); EL 0.297–0.323 (0.308); PH 0.570–0.590 (0.583); PW 0.747–0.806 (0.775); WL 1.227–1.356 (1.294); PSL 0.089–0.098 (0.093); PTH 0.354–0.374 (0.363); PTL 0.354–0.384 (0.370); PTW 0.364–0.384 (0.375); PPH 0.517–0.568 (0.536); PPL 0.295–0.403 (0.362); PPW 0.443–0.472 (0.462); OI 24–26 (25); CI 95–101 (98); SI 67–72 (70); DMI 56–62 (60); LMI 42–49 (45); PSLI 7–8 (8); PeNI 46–50 (48); LPeI 95–108 (102) DPpI 108–132 (101); PpNI 58–62 (60); LPpI 57–76 (68); DPpI 117–153 (129); PPI 118–127 (123).

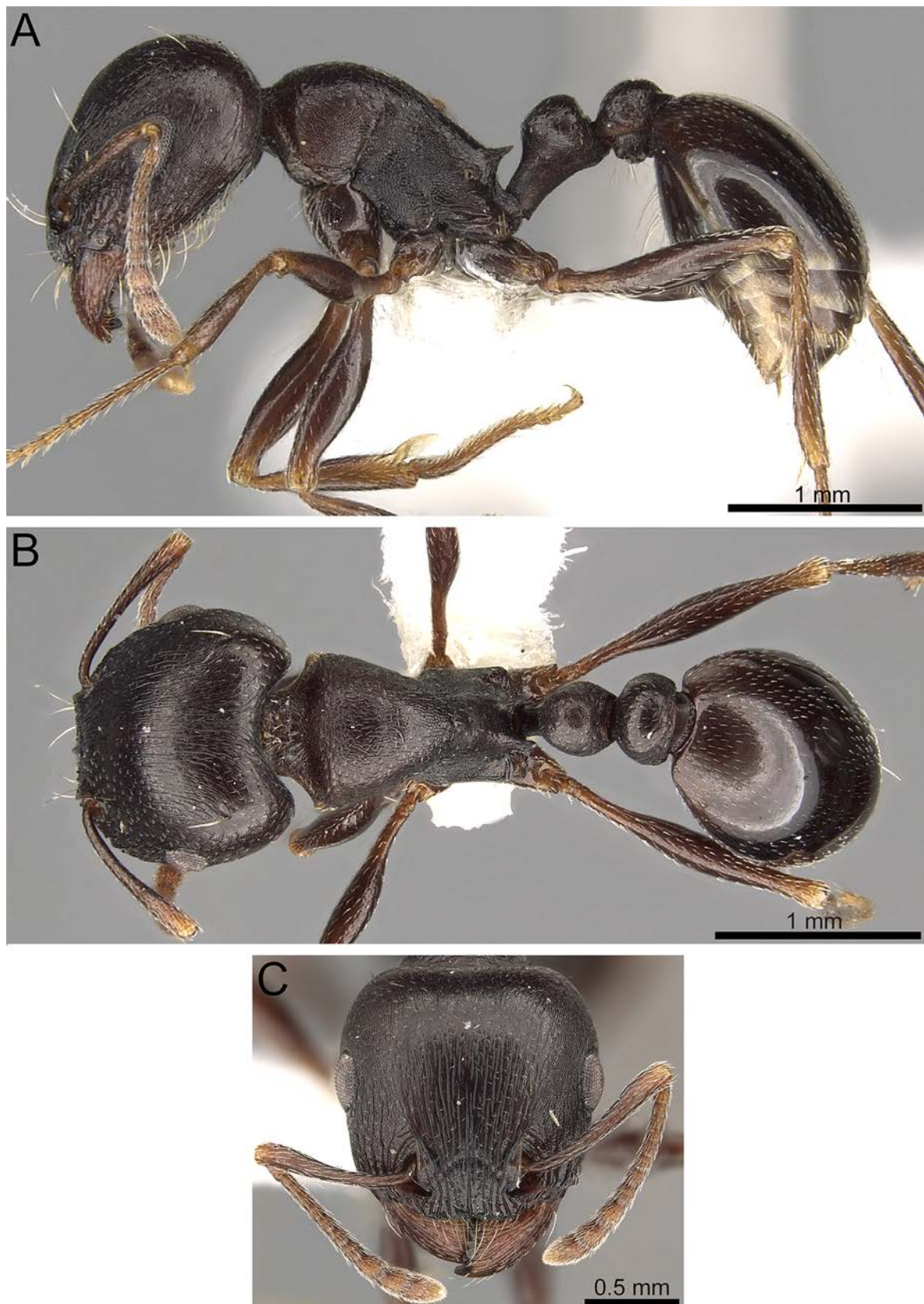
**Distribution**

Only known from the type locality, Okombahe in Namibia.

***Tetramorium brigittae* Mbanyana, Robertson & Hita Garcia sp. nov.**  
[urn:lsid:zoobank.org:act:CC0CCBD7-3D23-4177-A1B8-36AC5B02A7DF](https://zoobank.org/act:CC0CCBD7-3D23-4177-A1B8-36AC5B02A7DF)  
Figs 4J, 7, 24

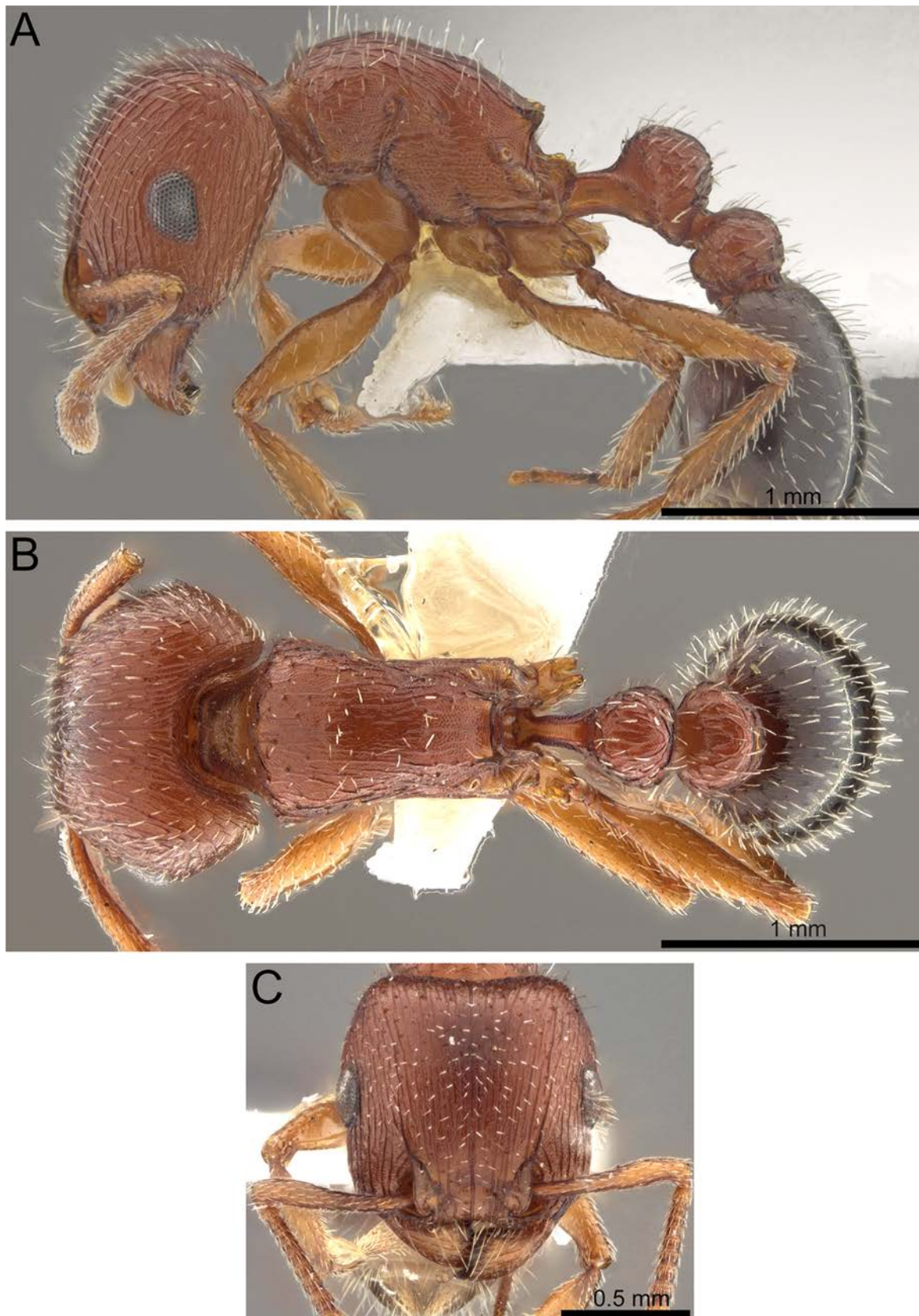
**Diagnosis**

*Tetramorium brigittae* sp. nov. is morphologically similar to *T. peringueyi*, *T. dichroum* and *T. margueriteae* sp. nov. These are the only species in the *solidum* group with abundant erect simple hairs covering the entire body. *Tetramorium brigittae* sp. nov. can be easily separated from *T. peringueyi* by the following characters: in *T. brigittae* sp. nov., dorsum of mesosoma with longitudinal striations and superficial ground sculpture in between (Fig. 7B), whereas in *T. peringueyi*, the dorsal surface of the mesosoma with strongly developed irregular reticulate sculpture (Fig. 4E); propodeum armed with a pair of short propodeal teeth (PSLI 6) in *T. brigittae* sp. nov., whereas in *T. peringueyi* the propodeum is armed with elongate spines (PSLI 22). Antennae with sub-erect pubescence in *T. brigittae* sp. nov., with erect hairs in *T. peringueyi*. *Tetramorium brigittae* sp. nov. can also be easily separated from *T. margueriteae* sp. nov.



**Fig. 6.** *Tetramorium barbigerum* Bolton, 1980 (CASTYPE13386 – Antweb, photographer unknown).  
A. Body in profile. B. Body in dorsal view. C. Head in full-face view.





**Fig. 7.** *Tetramorium brigitteae* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C027040). A. Body in profile. B. Body in dorsal view. C. Head in full-face view.

on the basis of colour and spine length, and also by the fact that *T. margueriteae* sp. nov. has erect hairs on the antennae, whereas *T. brigitteae* sp. nov. has sub-erect pubescence on the antennae. *Tetramorium brigitteae* sp. nov. and *T. dichroum* both have sub-erect hairs on the antennae, and in both species the dorsum of the mesosoma has longitudinal striations and a superficial ground sculpture in between. These two species can be separated on the basis of spine length and colour. In *T. brigitteae* sp. nov., propodeum armed with short propodeal teeth (PSLI 6) (Fig. 4J), whereas in *T. dichroum* propodeum armed with acute spines (PSLI 14) (Fig. 4I). *Tetramorium brigitteae* sp. nov. is reddish brown, with gaster black, whereas *T. dichroum* is light brown in colour, with gaster a little darker compared to the mesosoma. The lateral sides of the mesosoma have strong reticulate-punctate sculpture in *T. brigitteae* sp. nov., whereas in *T. dichroum* the sides of the mesosoma have lateral striations with a superficial reticulate sculpture in between.

### Etymology

Named after Dr Brigitte Braschler who collected the holotype and who has made a significant contribution to our knowledge of southern African arid ants through field work conducted as part of the DST/NRF Centre of Excellence for Invasion Biology's Imbovane project.

### Material examined

#### Holotype

SOUTH AFRICA: **Northern Cape**: worker, near Augrabies Falls National Park, on R359 past turnoff for Augrabies National Park, 28.623° S, 20.328° E, 639 m a.s.l., 13 Dec. 2011, Brigitte Braschler (SAM-HYM-C027040).

#### Measurements (worker N = 1)

HL 0.982; HW 1.059; SL 0.736; EL 0.284; PH 0.374; PW 0.672; WL 1.098; PSL 0.054; PTH 0.364; PTL 0.349; PTW 0.375; PPH 0.452; PPL 0.362; PPW 0.426; OI 27; CI 108; SI 70; DMI 61; LMI 34; PSLI 6; PeNI 56; LPeI 96; DPeI 107; PpNI 63; LPpI 80; DPpI 118; PPI 114.

### Description

#### Holotype (worker)

Mandibles with fine longitudinal striations. Anterior clypeal margin with extensive and deep indentation. Frontal carinae extending back to posterior margins of eyes. Eyes with 16 ommatidia in longest row. Propodeum armed with pair of short propodeal teeth (PSLI 6), teeth longer than basal width. Metapleural lobes low and rounded. Peduncle with prominent keel-shaped subpetiolar process. Petiolar node in profile nodiform, with posterior face slightly more steeply angled than anterior face; anterior face rounding into dorsum but with slightly angled corners as seen in dorsal view. Postpetiolar node low and rounded. Peduncle lacking subpetiolar process. Dorsal surfaces of head and mesosoma with longitudinal striations, spaces between them with superficial ground sculpture. Petiolar and postpetiolar nodes with fine reticulate sculpture overlain by few irregular transverse striations. Gastral tergite with longitudinal short striations basally and remaining part with fine reticulate pattern. All dorsal surfaces of body with abundant, short to moderately long, erect pilosity. Antennae with sub-erect pubescence. Tibia of middle and hind legs with numerous short, stout, erect hairs. Ventral surface of head with strongly developed psammophore. Head and mesosoma light brown in colour and gaster black.

### Distribution

Known from one specimen which was collected from the Nama Karoo region in the Northern Cape in South Africa.

***Tetramorium clunum* Forel, 1913**

Figs 2D, 3B, 8, 24

*Tetramorium setuliferum* st. *cluna* Forel, 1913: 218.

**Diagnosis**

In the *T. solidum* group there are only three species with short, broad, flattened and strongly appressed glittering silvery hairs covering the body (Fig. 2D–F), namely, *T. setuliferum*, *T. clunum* and *T. galoasanum*. *Tetramorium galoasanum* is distinguished from the other two species by its long, dense, overlapping strap-like hairs, whereas in the other two species these hairs are sparse and spaced out. *Tetramorium clunum* is separated from *T. setuliferum* by the following characters: (1) first gastral tergite does not overhang the tergosternal suture in profile (Fig. 3B); (2) first gastral tergite is sculptured throughout whereas in *T. setuliferum* only the base is sculptured; (3) dorsum of head behind clypeus with at least one pair of erect hairs, whereas *T. setuliferum* lacks elongate erect hairs on the dorsum of head; and (4) tergum of postpetiole without lateral alar prominences, whereas these are present in *T. setuliferum*.

**Material examined**

**Syntypes**

SOUTH AFRICA: workers, Eastern Cape, Willowmore, Dec. 1912, H. Brauns leg. (BMNH: CASENT0901182; MHNG: CASENT0909155).

**Other material**

SOUTH AFRICA (26 pinned specimens): **Eastern Cape:** Fish River Valley, Jun. 1965 (SAM-HYM-C004009); Willowmore, Sep. 1919, H. Brauns leg. (SAM-HYM-C004010); Willowmore, 33° S, 22° E, 500 m a.s.l., nest in sandy soil, 1 Dec. 1976, C.F. Jacot-Guillarmod leg. (CASC: CASENT0217964; BMNH: CASENT0764600 to CASENT0764602). – **Western Cape:** Oudtshoorn, Grootkop Nature Reserve, 33.577917° S, 22.217028° E, 373 m a.s.l., 10 Mar. 2006, Succulent Karoo, pitfall trap, B. Braschler leg. (SAM-HYM-C024965); Josephskraal, 33.04182° S, 20.72157° E, 896 m a.s.l., Koedoesberge-Moordenaars Karoo, deep soil on elevated flood plain, 16 Apr. 2008, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020467); Nature's Valley, 33°58'38" S, 23°33'39" E, 10 m a.s.l., 8 Dec. 1967, A.J. Prins leg. (SAM-HYM-C015136). – **Northern Cape:** Melton Wold, 31.46189° S, 22.72417° E, 1331 m a.s.l., 9 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023304).

**Measurements** (worker N = 11)

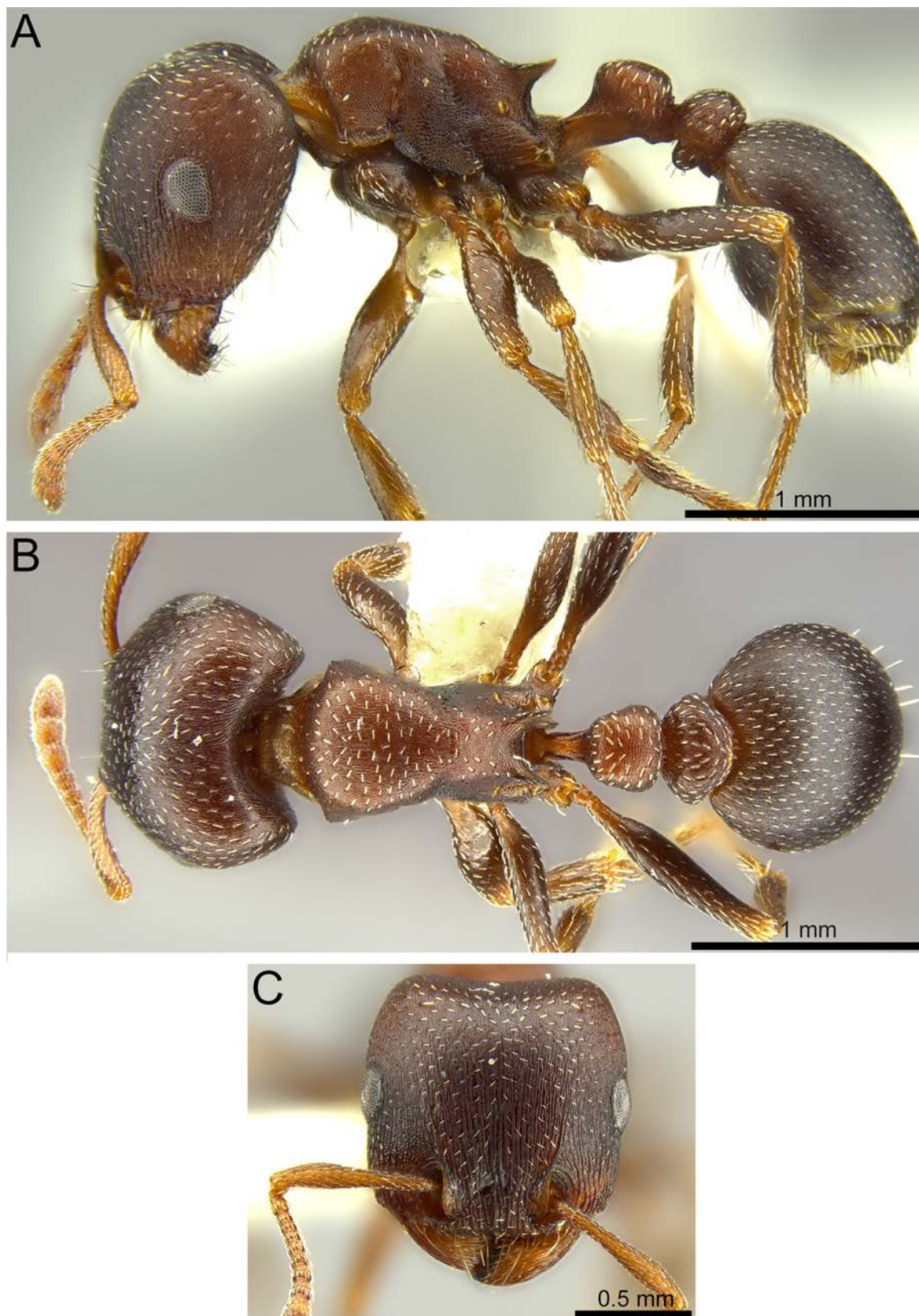
HL 0.885–1.062 (0.958); HW 0.919–1.090 (0.991); SL 0.688–0.757 (0.723); EL 0.207–0.266 (0.239); PH 0.482–0.570 (0.544); PW 0.570–0.669 (0.609); WL 0.922–1.023 (0.963); PSL 0.157–0.177 (0.168); PTH 0.285–0.344 (0.307); PTL 0.295–0.340 (0.315); PTW 0.305–0.381 (0.325); PPH 0.413–0.530 (0.461); PPL 0.187–0.246 (0.207); PPW 0.374–0.472 (0.401); OI 22–27 (24); CI 101–105 (103); SI 69–76 (73); DMI 61–67 (63); LMI 51–62 (57); PSLI 15–19 (18); PeNI 49–57 (53); LPeI 97–113 (103); DPeI 92–112 (103); PpNI 63–71 (66); LPpI 40–58 (45); DPpI 152–218 (195); PPI 117–127 (124).

**Distribution**

*Tetramorium clunum* has been recorded from South Africa (Eastern Cape, Western Cape and Northern Cape) and Namibia, where it occurs in Nama Karoo, Succulent Karoo and Namib Desert.

This is a ground-nesting species. It has been recorded nesting in deep soils. Nothing is known about its feeding behaviour, but presumably this species feeds on seeds, as this is recorded for most other species of this group. This species has been collected in yellow pan traps, pitfall traps and by turning stones.





**Fig. 8.** *Tetramorium clunum* Forel, 1913 (CASENT0764600). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

***Tetramorium dichroum* Santschi, 1932**

Figs 2A, 4I, 9, 24

*Tetramorium solidum* st. *dichroum* Santschi, 1932: 388.

**Diagnosis**

In the *Tetramorium solidum*-group, there are five species with abundant hairs covering the dorsal surfaces of the whole body, namely, *T. rothschildi*, *T. peringueyi*, *T. dichroum*, *T. margueriteae* sp. nov. and *T. brigitteae* sp. nov. *Tetramorium rothschildi* is easily separated from other species by having branched hairs. *Tetramorium dichroum* can be easily distinguished from *T. peringueyi* and *T. margueriteae* sp. nov. by the absence of erect hairs on the antennal scapes. *Tetramorium dichroum* and *T. brigitteae* sp. nov. can be distinguished on the basis of the spine length: in *T. dichroum* spines are long and acute (PSLI 10–16) (Fig. 4I), whereas *T. brigitteae* sp. nov. has very short propodeal teeth (PSLI 6) (Fig. 4J).

**Material examined**

**Syntypes**

SOUTH AFRICA: 3 pinned workers, Northern Cape, Kimberley, 1924, Power leg. (NHMB: CASENT0915004; SAMC: SAM-ENT-0011758).

**Other material**

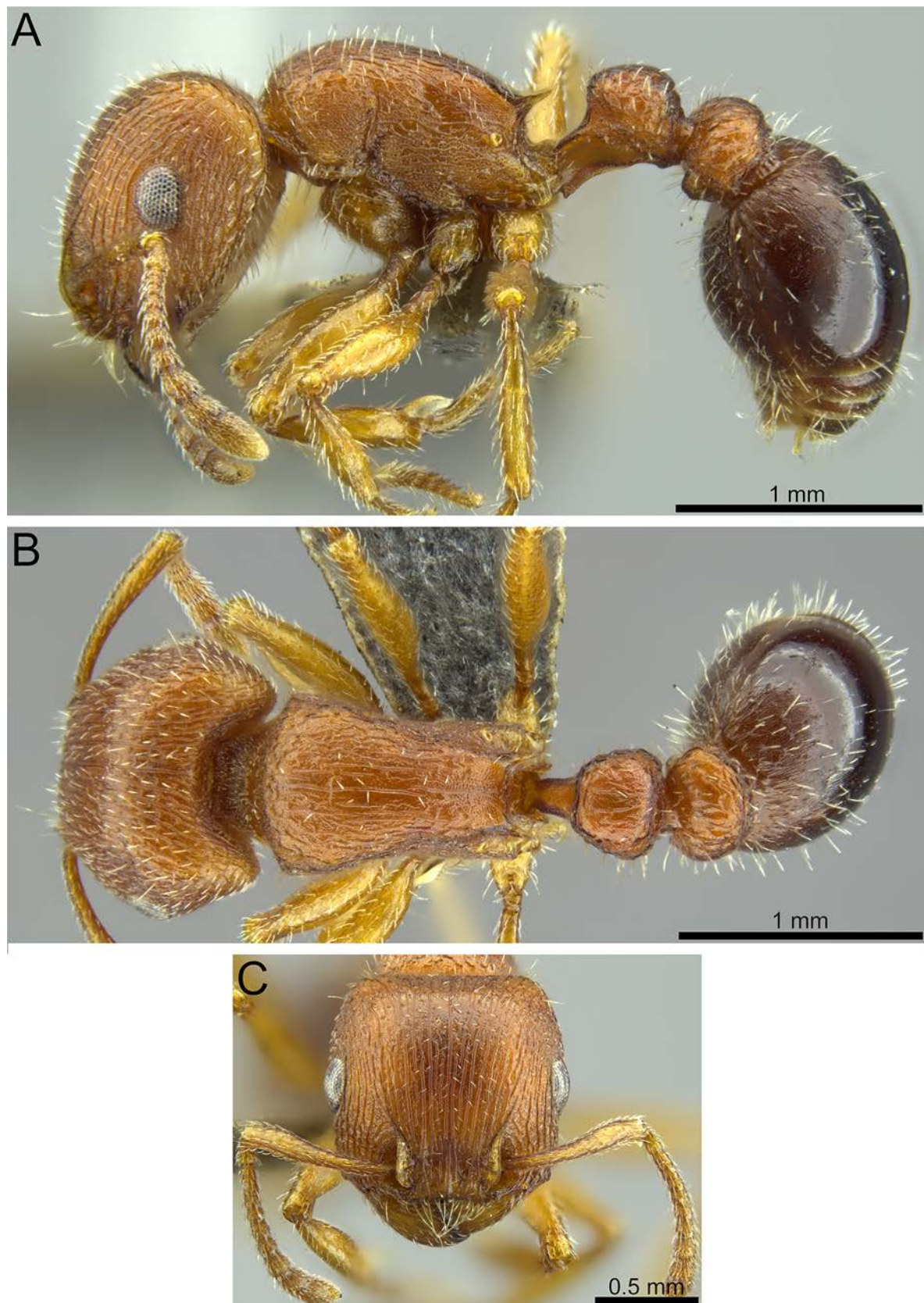
SOUTH AFRICA (40 pinned specimens): **Orange Free State:** Tussen Die Riviere, 30.295° S, 26.14° E, 30 Mar.–1 Apr. 1987, H.G. Robertson leg. (SAM-HYM-C000310); Springfontein, Hillside Farm, 30°09' S, 25°46' E, 28 Sep. 1995, H. Adie leg. (SAM-HYM-HYM-C008451). – **Northern Cape:** Kortkop farm near Strydenburg, 30°09' S, 23°44' E, 17 Jun. 1995, ex pitfall trap, Karoo vegetation, B. Chambers leg. (SAM-HYM-C008779); Tankwa Karoo National Park, 32.17430° S, 19.97382° E, 602 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023307); Melton Wold, 31.46189° S, 22.72417° E, 1331 m a.s.l., 9 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C024387). – **Eastern Cape:** Cookhouse, 26 Jul. 1944, Agricultural Research Institute – Pretoria leg. (SAM-HYM-C011579); Oviston, dolerite koppie, 21 Nov. 1988, W.R.J. Dean leg. (SAM-HYM-C001484); Kudu Reserve in Great Fish River, 33°7'42" S, 26°41'32" E, Grassland, 25–30 Apr. 2005, T. Jordan leg. (SAM-HYM-C018977). – **Western Cape:** Molenrivier, 3 Feb. 1959, A. Boonzaaier leg. (SAM-HYM-C019203); Klein Pakhuis, 32.14398° S, 19.05645° E, 506 m a.s.l., 10 Sep. 2009, P. Hawkes and J. Fisher leg. (SAM-HYM-C024390); Cederberg Wilderness Area, Wupperthal, Hiking trail between Sneeuksop Hut and Wupperthal site 3, 32.31096° S, 19.17055° E, 934 m a.s.l., 11 Oct. 2002, Fynbos, pitfall trap, A. Botes leg. (SAM-HYM-C024966).

ZAMBIA (4 pinned specimens): Northern Province, Luangwa National Park, 13.1667° S, 31.5° E, 500 m a.s.l., hand collected, 1 Jan. 2005, R. van den Elzen leg. (BMNH: CASENT0746318 to CASENT0746321).

**Measurements** (worker N=11)

HL 0.934–1.023 (0.987); HW 0.944–1.072 (1.003); SL 0.659–0.747 (0.703); EL 0.216–0.246 (0.237); PH 0.393–0.521 (0.451); PW 0.590–0.669 (0.638); WL 0.924–1.121 (1.015); PSL 0.098–0.157 (0.136); PTH 0.315–0.364 (0.341); PTL 0.275–0.354 (0.325); PTW 0.315–0.374 (0.343); PPH 0.315–0.491 (0.438); PPL 0.246–0.285 (0.267); PPW 0.382–0.457 (0.415); OI 23–25 (24); CI 100–105 (102); SI 66–73 (70); DMI 59–70 (63); LMI 39–52 (45); PSLI 10–16 (14); PeNI 50–57 (54); LPeI 85–100 (95); DPeI 99–114 (106); PpNI 61–70 (65); LPpI 50–80 (62); DPpI 144–186 (156); PPI 115–128 (121).





**Fig. 9.** *Tetramorium dichroum* Santschi, 1932 (CASENT0746320). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.



### Distribution

*Tetramorium dichroum* has been recorded from South Africa (Eastern Cape Province, southern parts of the Free State, Northern Cape and Western Cape Provinces) and Zambia. This species occurs in Drakensberg Montane Grasslands, Kalahari Xeric Savanna, Montane Fynbos and Renosterveld, Nama Karoo, Succulent Karoo, Zambezi and Mopane Woodlands.

*Tetramorium duncani* Mbanyana, Robertson & Hita Garcia sp. nov.  
[urn:lsid:zoobank.org:act:6F687F00-D1C3-4DB9-8B3D-A588A1ED5A8F](https://zoobank.org/act:6F687F00-D1C3-4DB9-8B3D-A588A1ED5A8F)

Figs 3N, 10, 24

### Diagnosis

Morphologically, *T. duncani* sp. nov. is similar to *T. pogonion*, *T. rufescens* and *T. signatum*, but can be distinguished from these species by the acute angle between the dorsum of the petiole and the posterior face when viewed laterally (Fig. 3N).

### Etymology

Named after Duncan Robertson, who assisted with field work, including photography of ants.

### Material examined

#### Holotype

NAMIBIA: worker, Withuis, 11 km N of Grunau on B1, 27°36.447' S, 18°23.920' E, 1243 m a.s.l., 3 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027003).

#### Paratypes (9 pinned workers)

NAMIBIA: Withuis, 11 km N of Grunau on B1, 27°36.447' S and 18°23.920' E, 1243 m a.s.l., 3 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027003); Withuis, 11 km N of Grunau on B1, 27°36.504' S and 18°23.823' E, 1241 m a.s.l., 2 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027004); Withuis, 11 km N of Grunau on B1, 27°36.447' S and 18°23.920' E, 1243 m a.s.l., 3 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027010); Kyffhauser, 24°28.708' S and 16°20.148' E, 1381 m a.s.l., 6 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027013); ca 132 km from Mariental on M29, 25°16.795' S, 18°37.635' E, 18 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027001).

#### Other material

SOUTH AFRICA (2 pinned specimens): **Northern Cape**: Breekkierie dunes, 30°07' S, 21°33' E, 4 May 1985, M.A. Macpherson leg. (SAM-HYM-C001771); Kortkop farm near Strydenburg, 30°09' S, 23°44' E, 17 Jun. 1995, B. Chambers leg. (SAM-HYM-C008763).

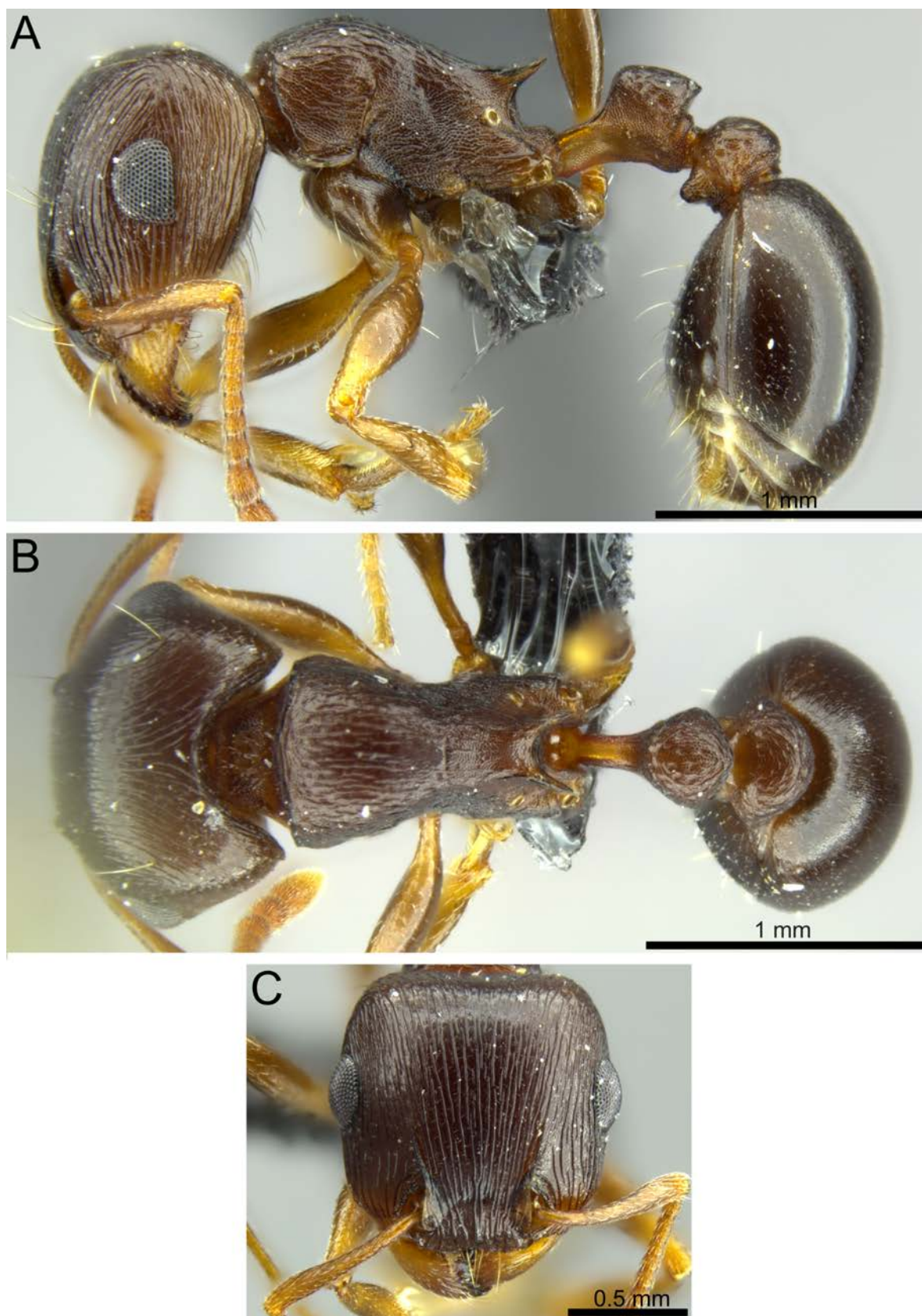
### Measurements (worker N=5)

HL 1.033–1.266 (1.132); HW 1.033–1.266 (1.116); SL 0.723–0.865 (0.798); EL 0.297–0.362 (0.320); PH 0.374–0.482 (0.452); PW 0.672–0.840 (0.716); WL 1.072–1.382 (1.168); PSL 0.148–0.187 (0.163); PTH 0.325–0.433 (0.358); PTL 0.297–0.336 (0.318); PTW 0.323–0.413 (0.364); PPH 0.465–0.607 (0.519); PPL 0.284–0.336 (0.310); PPW 0.413–0.555 (0.475); OI 27–31 (29); CI 97–100 (99); SI 68–75 (71); DMI 59–63 (61); LMI 35–44 (39); PSLI 12–17 (15); PeNI 48–54 (51); LPeI 78–96 (89); DPpI 104–123 (115); PpNI 62–69 (66); LPpI 54–68 (60); DPpI 139–168 (153); PPI 128–134 (130).

### Description

#### Holotype (worker)

Mandibles with fine longitudinal striations. Anterior clypeal margin with conspicuous, semicircular indentation. Frontal carinae fading out before reaching back of posterior eye margin. Eyes with 16



**Fig. 10.** *Tetramorium duncani* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C027003). A. Body in profile. B. Body in dorsal view. C. Head in full-face view.

ommatidia in longest row. Propodeum armed with pair of long spines (PSLI 12–17). Metapleural lobes low, rounded. Peduncle lacking subpetiolar process. Petiolar node in profile nodiform, with anterior face rounding onto dorsum and dorsum forming acute angle with posterior face. Postpetiolar node low and rounded. Dorsal surfaces of head with longitudinal striations, spaces between them with superficial ground sculpture. Dorsum of mesosoma with short longitudinal striations, with shiny superficial ground sculpture in between them. Petiolar and postpetiolar nodes with fine reticulate sculpture overlain by few irregular striations. Gastral tergite with fine, superficial reticulate pattern. Dorsum of head with four long erect pairs of hairs. Ventral surface of head with strongly developed psammophore. Remaining dorsum of the body without any standing hairs. Colour blackish brown.

### Distribution

Known from Namibia and South Africa (Northern Cape), where these specimens were collected from Namibian Savanna Woodlands and Kalahari Xeric Savanna. Specimens collected by hand (including in nets) and from pitfall traps.

#### *Tetramorium galoasanum* Santschi, 1910

Figs 2E, 11

*Tetramorium setuliferum* var. *galaosana* Santschi, 1910: 381.

### Diagnosis

*T. galoasanum*, *T. clunum* and *T. setuliferum* are the only species in the *Tetramorium solidum* group with appressed silvery hairs covering the entire body (Fig. 2E). The appressed silvery hairs are denser in *T. galoasanum* than in the other two species.

### Material examined

#### Syntypes

REPUBLIC OF CONGO: Brazzaville, M'Bounion, Mindouga, Comba-Ibre, Aug. 1908, Weiss leg. (NHMB: CASENT0915015; RMCA: RMCAENT000017787; MCZC (not examined); BMNH: CASENT0901178).

### Distribution

Only known from Congo.

#### *Tetramorium glabratum* Stitz, 1923

Figs 2G, 3F, H, L, O, 4B, 12, 24

*Tetramorium solidum* st. *glabratum* Stitz, 1923: 162 (included in Bolton 1980: 246).

*Tetramorium solidum* race *glabratum* var. *aciculatum* Stitz, 1923: 162.

*Tetramorium rutilum* Prins, 1973: 14 (included in Bolton 1980: 246).

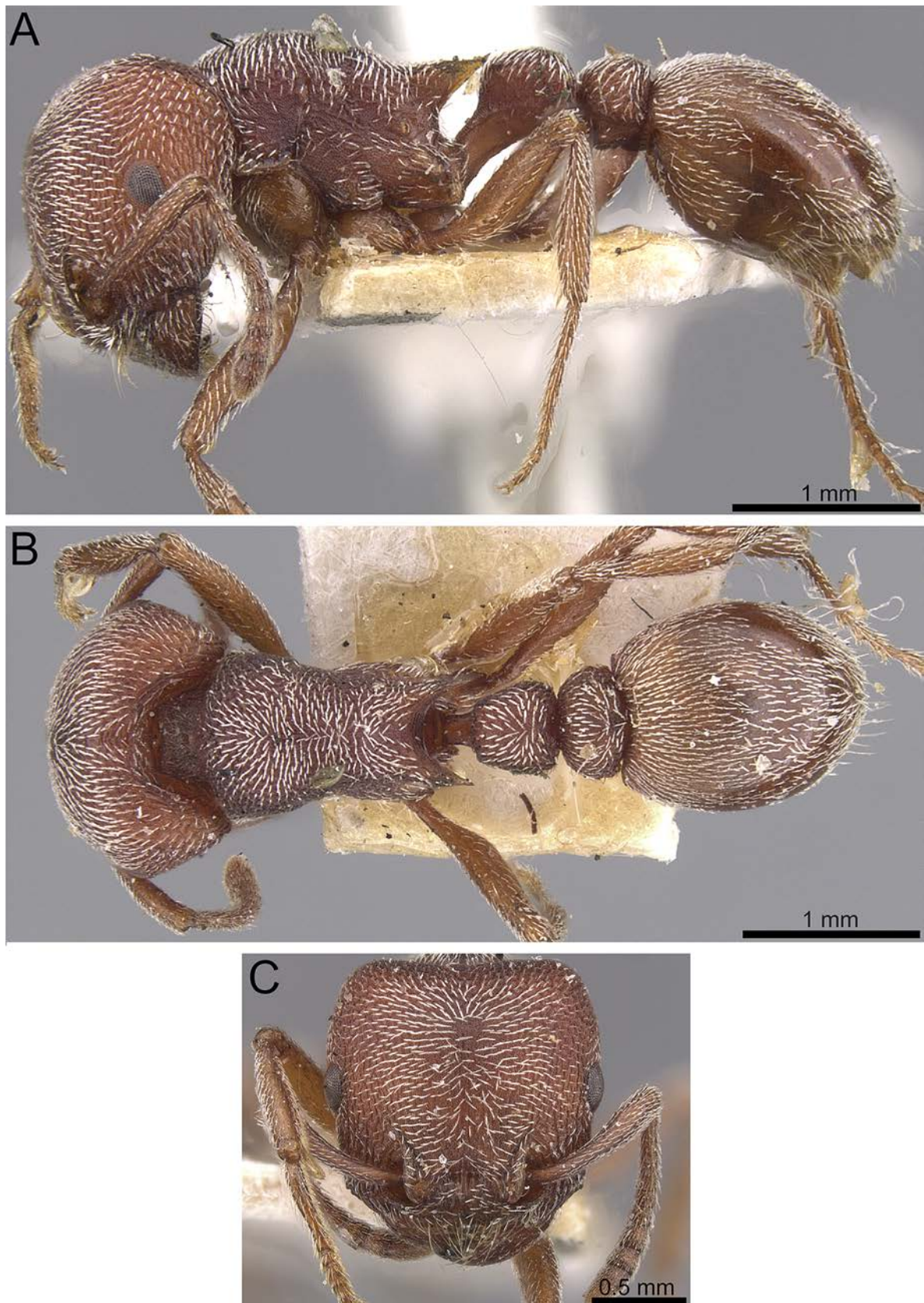
### Diagnosis

*Tetramorium glabratum* is similar to *T. rufescens*. They both lack pilosity on the dorsum of the mesosoma and on the first gastral tergite and are both reddish coloured. *Tetramorium glabratum* can be distinguished from the latter by the short and broad propodeal spines (PSLI 4–8) (3H), which are long and narrow in *T. rufescens* (PSLI 16–23) (Fig. 3I).

### Unexamined type material

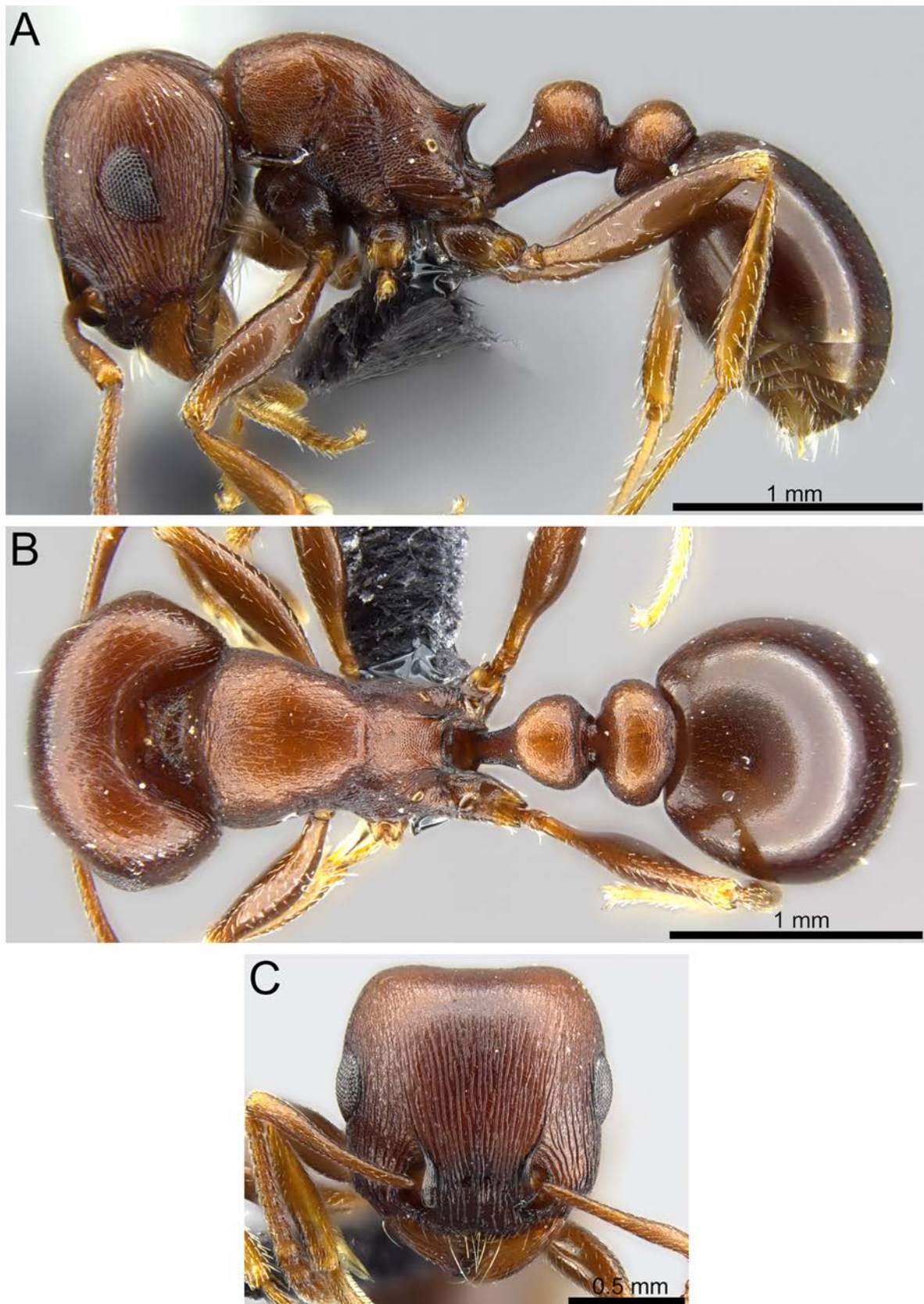
NAMIBIA: holotype of *Tetramorium solidum* st. *glabratum* Stitz, 1923, worker: Karibib, 23–26 Apr. 1911, W. Michaelsen leg. (ZMHB: FOCOL2085); holotype of *Tetramorium solidum* race *glabratum* var.





**Fig. 11.** *Tetramorium galoasanum* Santschi, 1910 (RMCAENT000017787 – Antweb, Will Ericson). A. Body in profile. B. Body in dorsal view. C. Head in full-face view.





**Fig. 12.** *Tetramorium glabratum* Stitz, 1923 (SAM-HYM-C024395). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

*aciculatum* Stitz, 1923: worker, Lüderitzbucht, 5–13 Jul. 1911, W. Michaelsen leg. (types not in ZMHB, presumably lost).

### Material examined

#### Type material

SOUTH AFRICA: syntypes of *Tetramorium rutilum* Prins, 1973: 8 pinned workers, 1 pinned ♀, Western Cape, Van Rhynsdorp, 19 Apr. 1963, J.J. Cillie leg. (SAM-ENT-0011750).

#### Other material

SOUTH AFRICA (24 pinned specimens): **Western Cape:** Klawer, 19 Apr. 1963, A.J. Prins leg. (SAM-HYM-C019335); Bitterfontein, 9 Oct. 1959, A.J. Prins leg. (SAM-HYM-C019341); Kleinsee, 29° S, 17° E, 12 Jul. 1995, M. Jones leg. (SAM-HYM-C024395); BPB Gypsum, 31°33.6' S, 18°45.2' E, 8 Nov. 2000, pitfall traps, A. Schmidt leg. (SAM-HYM-C023291). – **Northern Cape:** Okiep, 21 Apr. 1963, A.J. Prins leg. (SAM-HYM-C019337); Garies, 6 Oct. 1959, A.J. Prins leg. (SAM-HYM-C019338); Port Nolloth, 7 Oct. 1959, A.J. Prins leg. (SAM-HYM-C019339); Springfontein, 8 Oct. 1969, A.J. Prins leg. (SAM-HYM-C019340); Port Nolloth, 7 Oct. 1959, A.J. Prins leg. (SAM-HYM-C019174, SAM-HYM-C019175); Port Nolloth, May 1986, A.J. Prins leg. (SAM-HYM-C019193).

NAMIBIA (5 pinned specimens): Diamond area, 28.3833° S, 16.31667° E, 29 Sep. 1994, E. Marais leg.; Oranjemund, Diamond area, 28.55° S, 16.45° E, 18 Sep. 1994, E. Marais leg.; Keetmanshoop District, Khabus 146, 26°18' S, 18°13' E, on sandy plain next riverbed, 14 Apr.–30 Jun. 1988, N. and G. Olivier leg.

#### Measurements (worker N = 7)

HL 1.042–1.141 (1.065); HW 1.031–1.092 (1.065) SL 0.757–0.836 (0.800); EL 0.295–0.315 (0.304); PH 0.462–0.531 (0.504); PW 0.667–0.738 (0.705); WL 1.033–1.239 (1.105); PSL 0.049–0.489 (0.060); PTH 0.344–0.374 (0.357); PTL 0.266–0.305 (0.290); PTW 0.315–0.384 (0.359); PPH 0.384–0.433 (0.410); PPL 0.246–0.275 (0.259); PPW 0.423–0.482 (0.452); OI 28–29 (29); CI 95–100 (97); SI 73–78 (75); DMI 57–71 (64); LMI 40–50 (46); PSLI 4–8 (5); PeNI 44–55 (51); LPeI 73–89 (81) DPeI 108–131 (124); PpNI 58–69 (64); LPpI 59–68 (63); DPpI 165–186 (174); PPI 120–141 (126).

### Distribution

This species is known from South Africa and Namibia. It has been collected from the Nama Karoo, Succulent Karoo and Namib Desert.

### Remarks

A detailed description of this species is given in Bolton 1980.

#### *Tetramorium grandinode* Santschi, 1913 Figs 3C, 13, 24

*Tetramorium grandinode* Santschi, 1913: 308 (included in Bolton 1980: 247).

*Tetramorium grandinode* var. *hopensis* Forel, 1914: 223 (included in Bolton 1980: 247).

### Diagnosis

The remarkable lateral extensions of both petiolar and postpetiolar nodes (Fig. 3C) distinguish *T. grandinode* from all other species in the *T. solidum* group. This species has superficial similarities with *T. duncani* sp. nov. in that *T. duncani* sp. nov. also has a broader postpetiole, but to a much lesser extent (DPpI 104–123) compared to *T. grandinode* (DPpI 184–322). Moreover, *T. grandinode* has a



much broader petiole node when viewed dorsally compared to *T. duncani* sp. nov. Additionally, these two species can be separated on the basis of the mesosoma sculpture: in *T. grandinode*, the dorsal surface has fine longitudinal rugulae and a glossy appearance in between, whereas in *T. duncani* sp. nov. it has a reticulate ground sculpture overlain by short fine longitudinal striations.

## Material examined

### Type material

SOUTH AFRICA: syntype of *Tetramorium grandinode* Santschi, 1913: worker, Western Cape, Cape Colony (NHMB: CASENT0915017); syntype of *Tetramorium grandinode* var. *hopensis* Forel, 1914, worker, Northern Cape, Orange River, Hope Town (MNHG: CASENT0909135).

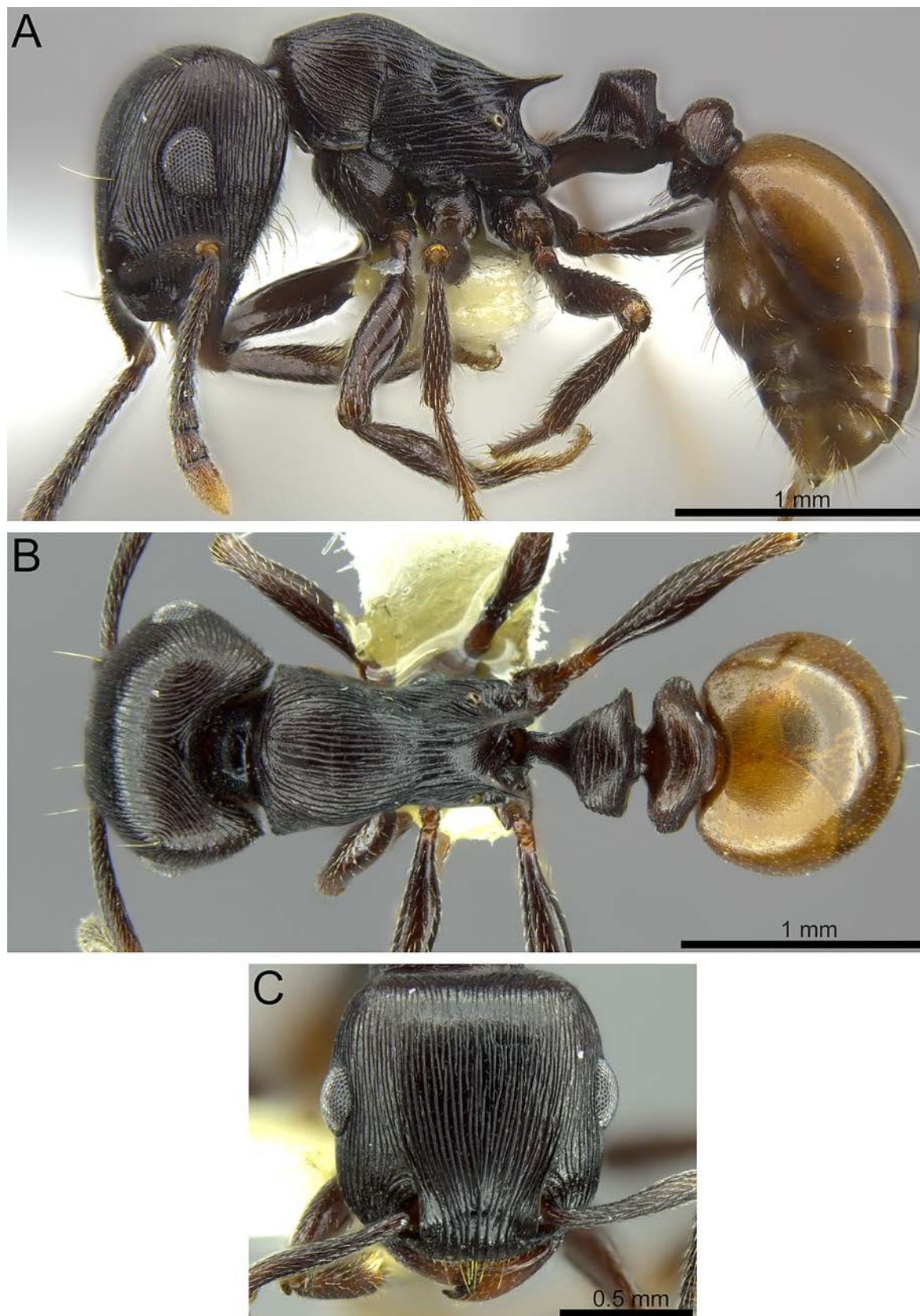
### Other material

SOUTH AFRICA (98 pinned specimens): **Northern Cape:** Goegap Nature Reserve, Jul. 1986, U. Kruger leg. (SAM-HYM-C013306); Tankwa Karoo National Park, 32.17430° S, 19.97382° E, 602 m a.s.l., 9 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023302); Road between Karsten Farms and Goodhouse, Klein Pella, 29.02700° S, 18.99008° E, 621 m a.s.l., Plein Gariep desert, deep soils without gravel, *Euphorbia* present, 16 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019900). – **Western Cape:** Prince Albert, Farm Argentina, 33.165444° S, 22.2595° E, 745 m a.s.l., 3 Mar. 2007, Succulent Karoo, pitfall trap, Imbovane Outreach Project, B. Braschler leg. (SAM-HYM-C024969); Abrahamskraal, 32.93011° S, 22.00949° E, 522 m a.s.l., 12 Apr. 2008, rocky ridges, with sparsely distributed shrubs including *Lycium*, shallow soils, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020349); Vêrgenoeg, 33.24421° S, 21.47939, 10 Apr. 2008, Koedoesberge-Moordenaars Karoo, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020425); Vêrgenoeg, 33.24467° S, 21.47597° E, 10 Apr. 2008, Koedoesberge-Moordenaars Karoo, east-facing rocky slope, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020434); Josephskraal, 33.04287° S, 20.71934° E, 900 m a.s.l., 16 Apr. 2008, Koedoesberge-Moordenaars Karoo, Karoo plain slightly N-facing, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020482).

NAMIBIA (42 pinned specimens): Navachab 67, Karibib District, SE 2715 Ba, Mar.–24 Apr. 1988, pitfall traps, S. Schubert leg.; Rotkop, Diamond Area 1, 26°42' S, 15°23' E, 12–26 Nov. 1993, pitfall trap, E. Marais leg.; Klein Aus 10, Luderitz District, 26°38' S, 16°10' E, 12–26 Nov. 1993, pitfall trap, E. Marais leg.; Khabus 146, Keetmanshoop District, 26°18' S, 18°13' E, sandy plain next to dry riverbed, 14 Mar.–14 Apr. 1983, N. and G. Olivier leg.; Wolwedans 144, Maltahöhe District, 25°06' S, 15°59' E, 12–18 Mar. 1992, pitfall trap, chateau dune, E. Griffin leg.; White house, 11 km N of Grünau, 27°36.666' S, 18°23.726' E, 1241 m a.s.l., nest in rocky soil with crater of soil around the entrance, 2 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C026796); Klein-Aus Vista, 26°39.143' S, 16°14.546' E, 1316 m a.s.l., nest in rocky sandy soil, two entrances at opposite sides of grass tuft, 4 Apr. 2011 (SAM-HYM-C026794); 59 km from Mariental on M29, 24°50.592' S, 18°17.173' E, 18 Apr. 2011, nest in rocky soil with rounded pebbles and red sandy soil, found under rock and excavated to a depth of 20 cm (SAM-HYM-C026793); Namib Desert, Ganab, G34, 25.1° S, 15.66° E, collected at the edge of sandy dry river bed, 18 May 1981, A.C. Marsh leg. (BMNH: CASENT0764655); Luderitz, 1 Sep. 2003, A. Andersen leg. (BMNH: CASENT0248477).

### Measurements (worker N=26)

HL 1.003–1.229 (1.122); HW 0.962–1.229 (1.095); SL 0.757–0.885 (0.816); EL 0.248–0.354 (0.301); PH 0.462–0.679 (0.528); PW 0.669–0.856 (0.743); WL 0.915–1.377 (1.189); PSL 0.197–0.275 (0.240); PTH 0.374–0.521 (0.431); PTL 0.246–0.344 (0.297); PTW 0.384–0.659 (0.523); PPH 0.384–0.570 (0.450); PPL 0.207–0.315 (0.255); PPW 0.482–0.875 (0.652); OI 27–29 (27); CI 95–102 (98); SI 68–180 (75); DMI 59–79 (63); LMI 39–54 (44); PSLI 19–24 (21); PeNI 56–83 (70); LPeI 58–85 (70); DPeI 130–212 (177); PpNI 68–110 (87); LPpI 45–73 (57); DPpI 184–322 (257); PPI 118–134 (124).



**Fig. 13.** *Tetramorium grandinode* Santschi, 1913 (CASENT0764655). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

### Distribution

*Tetramorium grandinode* is known to occur in South Africa (Northern Cape, Western Cape) and Namibia, where it has been collected in the Kalahari Xeric Savanna, Nama Karoo, Succulent Karoo, Namibian Savanna Woodlands and Namib Desert.

### Remarks

This species has been recorded nesting in deep soil on a flood plain. Specimens of *T. grandinode* have been collected from pitfall traps, tuna baits, sugar baits and cookie bait.

### *Tetramorium jordani* Santschi, 1937

Figs 3G, 14, 24

*Tetramorium jordani* Santschi, 1937: 62.

*Tetramorium aspinatum* Prins, 1973: 12 (included in Bolton 1980: 248).

### Diagnosis

*Tetramorium jordani* is the only species in the *Tetramorium solidum* group with the combination of no propodeal spines (the propodeum is only angulated with PSLI 1–3) and a hairless body (Fig. 3G). The only other species without propodeal spines is *T. brigitteae* sp. nov., which has erect hairs covering the entire body.

### Material examined

#### Type material

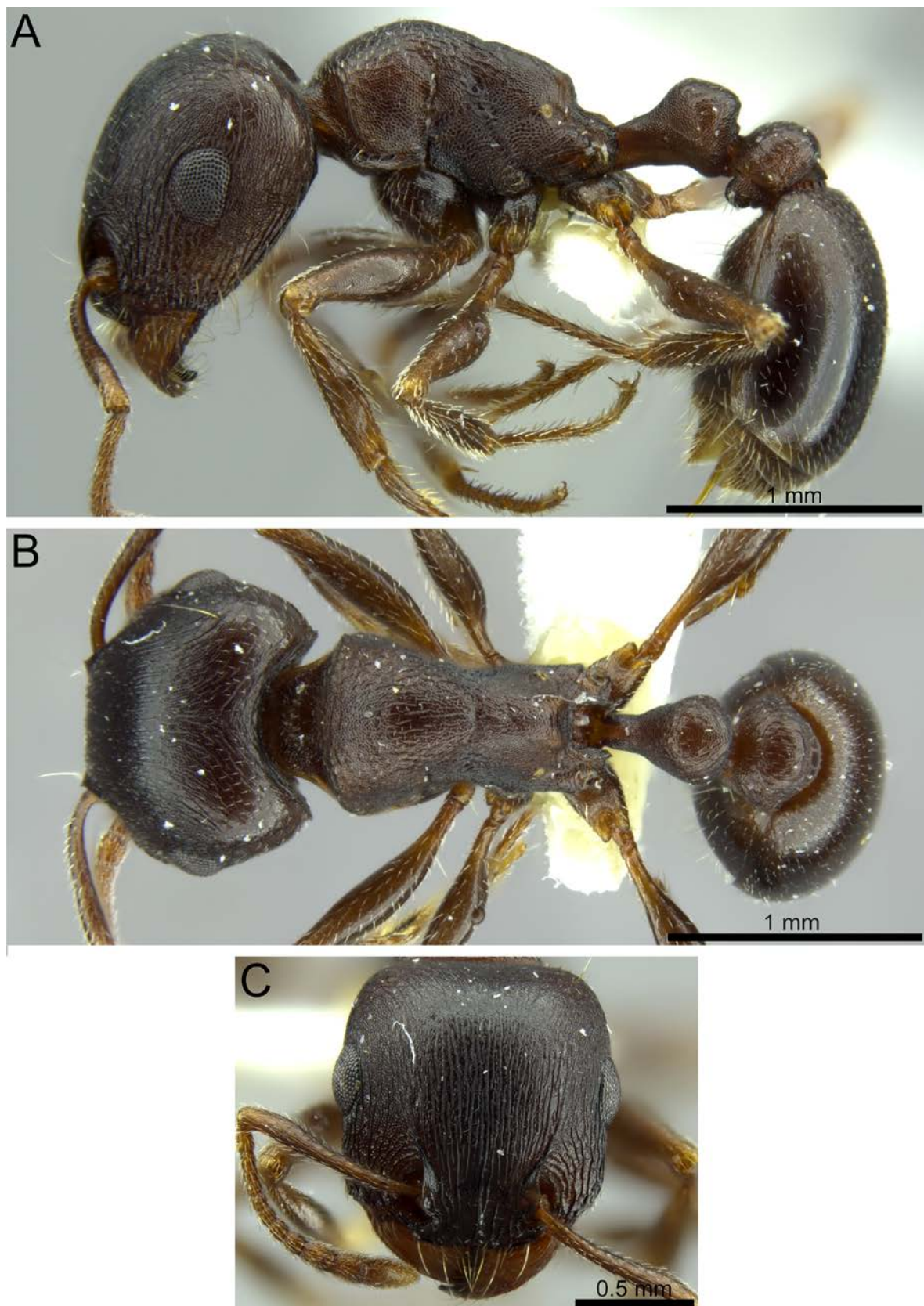
NAMIBIA: 2 syntypes of *Tetramorium jordan* Santschi, 1937: W of Maltahohe, 1500 m a.s.l., 12 Dec. 1933, K. Jordan leg. (BMNH: CASENT0901180; NHMB: CASENT0915021).

SOUTH AFRICA: syntypes of *Tetramorium aspinatum* Prins, 1973, 8 pinned workers, Northern Cape, Port Nolloth, 20 Apr. 1963, J.J. Cillie leg. (SAM-ENT0011753).

#### Other material

SOUTH AFRICA (112 pinned workers): **Northern Cape:** Rondabel 542 (Farm), 30°50' S, 17°45' E, 4 Sep. 1996, on vegetated red dunes, V.B. Whitehead leg. (SAM-HYM-C008958); Rietfontein bos, 23 Apr. 1963 (SAM-HYM-C019259); Calvinia, 24 Apr. 1963 (SAM-HYM-C019261); Springbok, 20 Apr. 1963, A.J. Prins leg. (SAM-HYM-C019260); Van Rhynsdorp, 5 May 1959, A.J. Prins leg. (SAM-HYM-C019262); Clanwilliam, 4 Jan. 1962, A.J. Prins leg. (SAM-HYM-C019265); Nardou Pass, 4 Jan. 1960, A.J. Prins leg. (SAM-HYM-C019266); Kamieskroon, 6 Oct. 1959, A.J. Prins leg. (SAM-HYM-C019267). – **Western Cape:** Namakwa Sands, 31°15'54.2" S, 17°55'50.8" E, 31 Mar.–4 Apr. 2003, pitfall trap, minespoil, Strandveld, N. Netshilaphala leg. (SAM-HYM-C018132); West Coast Fossil Park (4 km 270° W of Langebaanweg), 32°58.444' S, 18°06.731' E, 4–11 Sep. 2002, pitfall trap, Sand Plain Fynbos dominated by *Lebeckia*, S. van Noort, D. Larsen and E. Bartnick leg. (SAM-HYM-C018894); West Coast Fossil Park (5.5 km 290° E of Langebaanweg), 32°57.51' S, 18°06.728' E, 4–11 Sep. 2002, pitfall trap, rehabilitated mine dump, S. van Noort, D. Larsen and E. Bartnick leg. (SAM-HYM-C018895); West Coast Fossil Park (3 km 280° W of Langebaanweg), 32°58.020' S, 18°07.285' E, 4–11 Sep. 2002, pitfall trap, rehabilitated mine dump, S. van Noort, D. Larsen and E. Bartnick leg. (SAM-HYM-C0188900); foragers, 16 mi. from Clanwilliam near Calvinia, 5 Jan. 1962, J.J. Cillie leg. (SAM-HYM-C015544); Petersfield, Citrusdal, 6 Mar. 1969, A.J. Prins leg. (SAM-HYM-C018314); Clanwilliam, Farm Sawadee, 32.3388° S, 18.987817° E, 332 m a.s.l., Fynbos, pitfall trap, A. Botes leg. (SAM-HYM-C024971).





**Fig. 14.** *Tetramorium jordani* Santschi, 1937 (CASENT0248475). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

NAMIBIA: Namib Naukluft National Park, Big Slip Face, 23.39° S, 15.20° E, 11 Sep. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000509); Namib Naukluft Khomabes, 23.33° S, 14.59° E, 11 Sep. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000498); Fish River Canyon, 1 Sep. 1998, A. Chapman leg. (BMNH: CASENT248475).

#### Measurements (worker N = 13)

HL 0.974–1.135 (1.071); HW 0.915–1.121 (1.064); SL 0.777–0.846 (0.795); EL 0.256–0.295 (0.266); PH 0.364–0.492 (0.453); PW 0.593–0.734 (0.673); WL 1.072–1.170 (1.158); PSL 0.010–0.030 (0.017); PTH 0.305–0.364 (0.340); PTL 0.285–0.334 (0.306); PTW 0.305–0.388 (0.342); PPH 0.452–0.555 (0.490); PPL 0.256–0.319 (0.289); PPW 0.416–0.492 (0.460); OI 23–28 (25); CI 94–109 (99); SI 69–85 (75); DMI 47–65 (58); LMI 32–44 (39); PSLI 1–3 (2); PeNI 48–56 (51); LPeI 85–94 (90); DPeI 104–123 (112); PpNI 62–75 (68); LPpI 55–63 (59); DPpI 136–177 (159); PPI 122–150 (135).

#### Distribution

This species has been recorded from arid regions of South Africa (Western Cape and Northern Cape) and Namibia in the following habitats: Succulent Karoo, Namib Desert, Lowland Fynbos and Renosterveld, Montane Fynbos and Renosterveld and Nama Karoo.

#### Remarks

*Tetramorium jordani* nests in sandy soils, with nests located either at the base of plants or with the entrance in the open, away from plants. The nest usually has a crater of soil around the entrance. In sand dunes of the Namib Desert, the tunnels inside the nest have crust-like walls to stop sand from falling in, and the entrance of one nest observed was funnel shaped due to the crust-like lining and the fact that the loose sand around the entrance was blown away by the wind. The species has been collected using yellow pan traps, pitfall traps and hand collecting. *Tetramorium jordani* feeds on seeds.

*Tetramorium lerouxi* Mbanyana, Robertson & Hita Garcia sp. nov.  
[urn:lsid:zoobank.org:act:A9FED9EF-D2F9-43FE-9A9B-20026D908BBF](https://zoobank.org/urn:lsid:zoobank.org:act:A9FED9EF-D2F9-43FE-9A9B-20026D908BBF)  
 Figs 3D, 15, 24

#### Diagnosis

*Tetramorium lerouxi* sp. nov. is distinguished from all other species of the *T. solidum* group by its unique petiolar node, which has posterior, lateral, rounded extensions; in posterior view, the dorsal margin is straight and angulate with respect to the lateral margin (Fig. 3D).

#### Etymology

Named after Dr Jaco Le Roux who supervised and helped with molecular genetic work on the *T. solidum* group, which helped to confirm the validity of this species.

#### Material examined

##### Holotype

SOUTH AFRICA: **Northern Cape**: worker, Melton Wold, 31.46741° S, 22.721550° E, 1333 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023330).

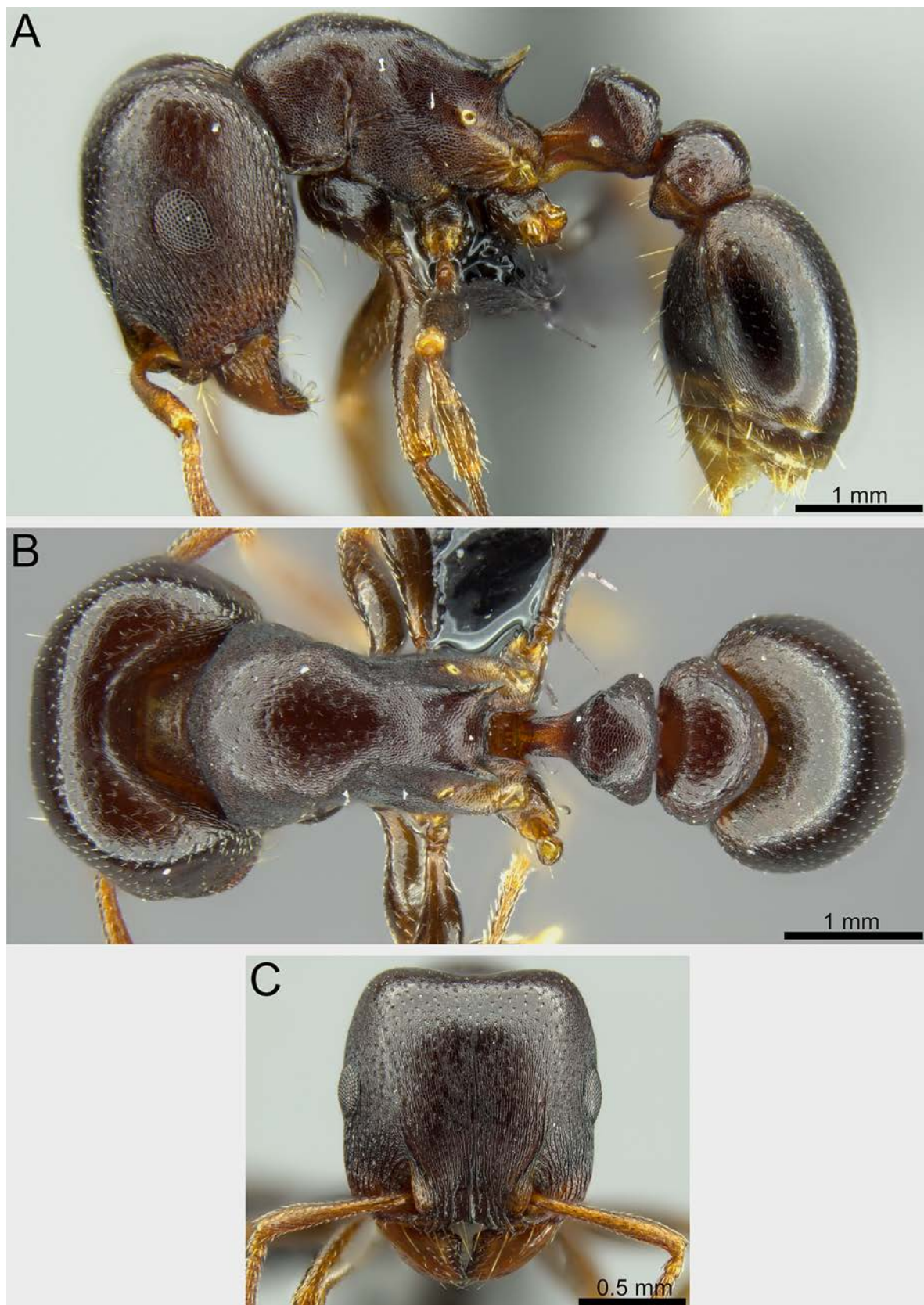
##### Paratypes

SOUTH AFRICA: 2 pinned workers, same collection data as for holotype (SAM-HYM-C023329).

##### Other material

SOUTH AFRICA: Orange Free State, Oranjekrag, 30°36'0" S, 25°30'0" E, 20 Mar. 1969, A.A. Boonzaaier leg. (AM-HYM-C015315).





**Fig. 15.** *Tetramorium lerouxi* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C027003). A. Body in profile. B. Body in dorsal view. C. Head in full-face view.



**Measurements** (worker N=2)

HL 1.080–1.151 (1.115); HW 1.151–1.210 (1.180); SL 0.767–0.738 (0.752); EL 0.275–0.285 (0.280); PH 0.570–0.580 (0.575); PW 0.713–0.767 (0.740); WL 1.180–1.190 (1.185); PSL 0.207–0.216 (0.211); PTH 0.452–0.462 (0.457); PTL 0.295–0.299 (0.297); PTW 0.446–0.482 (0.464); PPH 0.443–0.452 (0.447); PPL 0.334–0.354 (0.344); PPW 0.572–0.600 (0.586); OI 24 (24); CI 105–107 (106); SI 61–67 (64); DMI 60–65 (62); LMI 48–49 (49); PSLI 18–20 (19); PeNI 63 (63); LPeI 65 (65); DPeI 149–163 (156); PpNI 78–80 (79); LPpI 74–80 (77); DPpI 162–179 (171); PPI 124–128 (126).

**Description****Holotype** (worker)

Mandibles predominantly smooth with fine striations basally. Anterior clypeal margin with extensive and deep indentation. Frontal carinae absent. Eyes with 15 ommatidia in longest row. Propodeal spines long and acute (PSLI 18–20). Metapleural lobes low and rounded. Peduncle with broad keel-shaped subpetiolar process. Petiole in profile nodiform, with anterior face slightly more steeply angled with blunt corners. In dorsal view, petiolar node shaped almost rectangular broadening posteriorly with rounded corners and narrowing anteriorly with prominent blunt corners (Fig. 3D). Postpetiole low and rounded both in dorsal view and in profile. Dorsum of head with fine longitudinal striations. Spaces between striations with very fine reticulate ground sculpture. Dorsal surfaces of mesosoma and petiole with fine reticulate sculpture. Postpetiolar node predominantly smooth, with fine reticulate sculpture in places. Gastral tergite with fine reticulate sculpture. Numerous hairs on anterior clypeal margin. Dorsum of head with two pairs of erect hairs. Dorsum of mesosoma, nodes and first gastral tergite without any erect hairs, with only sparse white pubescence. Ventral surface of head with psammophore. Colour uniformly black.

**Distribution**

This species is only known from South Africa, where it has been collected in Melton Wold near Victoria West in the Northern Cape and from Oranjekrag in the Free State.

*Tetramorium margueriteae* Mbanyana, Robertson & Hita Garcia sp. nov.

[urn:lsid:zoobank.org:act:6E9371F8-EEC3-4487-8333-BB6CCEE01932](https://zoobank.org/act:6E9371F8-EEC3-4487-8333-BB6CCEE01932)

Figs 4F, H, 16, 24

**Diagnosis**

Morphologically, *T. margueriteae* sp. nov. is similar to *T. peringueyi*, *T. dichroum* and *T. brigitteae* sp. nov. in that, these are the only species in the *solidum* group with erect simple hairs covering the entire body. This species can be separated from *T. peringueyi* on the basis of colour and the pattern of the sculpture on the mesosoma. *Tetramorium margueriteae* sp. nov. is black in colour, whereas *T. peringueyi* is orange to light brown. In *T. peringueyi*, the dorsal surface of the mesosoma has a strongly developed irregular reticulate sculpture (Fig. 4E), whereas in *T. margueriteae* sp. nov. the dorsum of the mesosoma has short longitudinal rugulae, and the ground sculpture is mainly smooth and shiny, with peripheral patches of fine, superficial reticulations (Fig. 4F). *Tetramorium margueriteae* sp. nov. is separated from both *T. dichroum* and *T. brigitteae* sp. nov. by the presence of erect hairs on the antennal scapes.

**Etymology**

Named after Marguerite Blignaut who helped with molecular lab work on the *T. solidum* group.

## Material examined

### Holotype

SOUTH AFRICA: **Northern Cape**: worker, Klein Pella, road between Karsten Farms and Goodhouse, Kokerboom site, 29.06211° S, 18.97985° E, 832 m a.s.l., Gariep Rocky Desert with Kokerboom and *Euphorbia*, 16 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019829).

### Paratypes

SOUTH AFRICA: **Northern Cape**: 24 pinned workers, same collection data as for holotype (SAM-HYM-C019827, SAM-HYM-C019836, SAM-HYM-C019838, SAM-HYM-C019839).

### Other material

SOUTH AFRICA (37 pinned workers): **Western Cape**: Tierberg, near Prince Albert, 33°10' S, 22°16' E, 14 Feb. 1995, H. Adie leg. (SAM-HYM-C008443); 6 km from Prince Albert on Leeu Gamka Road, 33°09' S, 22°02' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009333); 27 km from Prince Albert on Leeu Gamka Road, 33°09' S, 22°02' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009334). – **Eastern Cape**: Kudu Reserve at Great Fish River, 33°07'42" S, 26°41'32" E, 25–30 Apr. 2005, grassland, T. Jordan leg. (SAM-HYM-C018977). – **Northern Cape**: Kortkop farm, Strydenburg, 30°09' S, 23°44' E, 17 Jun. 1995, pitfall traps, on Karoo vegetation, B. Chambers leg. (SAM-HYM-C008768); same collection data as for holotype (SAM-HYM-C019825); Klein Pella, road between Karsten Farms and Goodhouse, Kokerboom site, 29.035271° S, 18.97662° E, 678 m a.s.l., East Gariep with large *Euphorbia*, 16 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019831); Rietfontein oos, 23 Apr. 1963 (SAM-HYM-C019198).

## Measurements (worker N=6)

HL 1.059–1.163 (1.107); HW 1.137–1.279 (1.199); SL 0.775–0.930 (0.840); EL 0.245–0.258 (0.256); PH 0.472–0.610 (0.528); PW 0.710–0.827 (0.764); WL 1.201–1.356 (1.281); PSL 0.167–0.207 (0.183); PTH 0.369–0.423 (0.392); PTL 0.388–0.413 (0.405); PTW 0.388–0.452 (0.415); PPH 0.439–0.594 (0.499); PPL 0.362–0.388 (0.377); PPW 0.478–0.530 (0.502); OI 20–23 (21); CI 107–110 (108); SI 66–74 (70); DMI 58–61 (60); LMI 39–45 (41); PSLI 14–19 (17); PeNI 52–56 (54); LPeI 98–109 (103); DPeI 100–106 (103); PpNI 62–68 (66); LPpI 65–82 (76); DPpI 127–141 (133); PPI 116–124 (121).

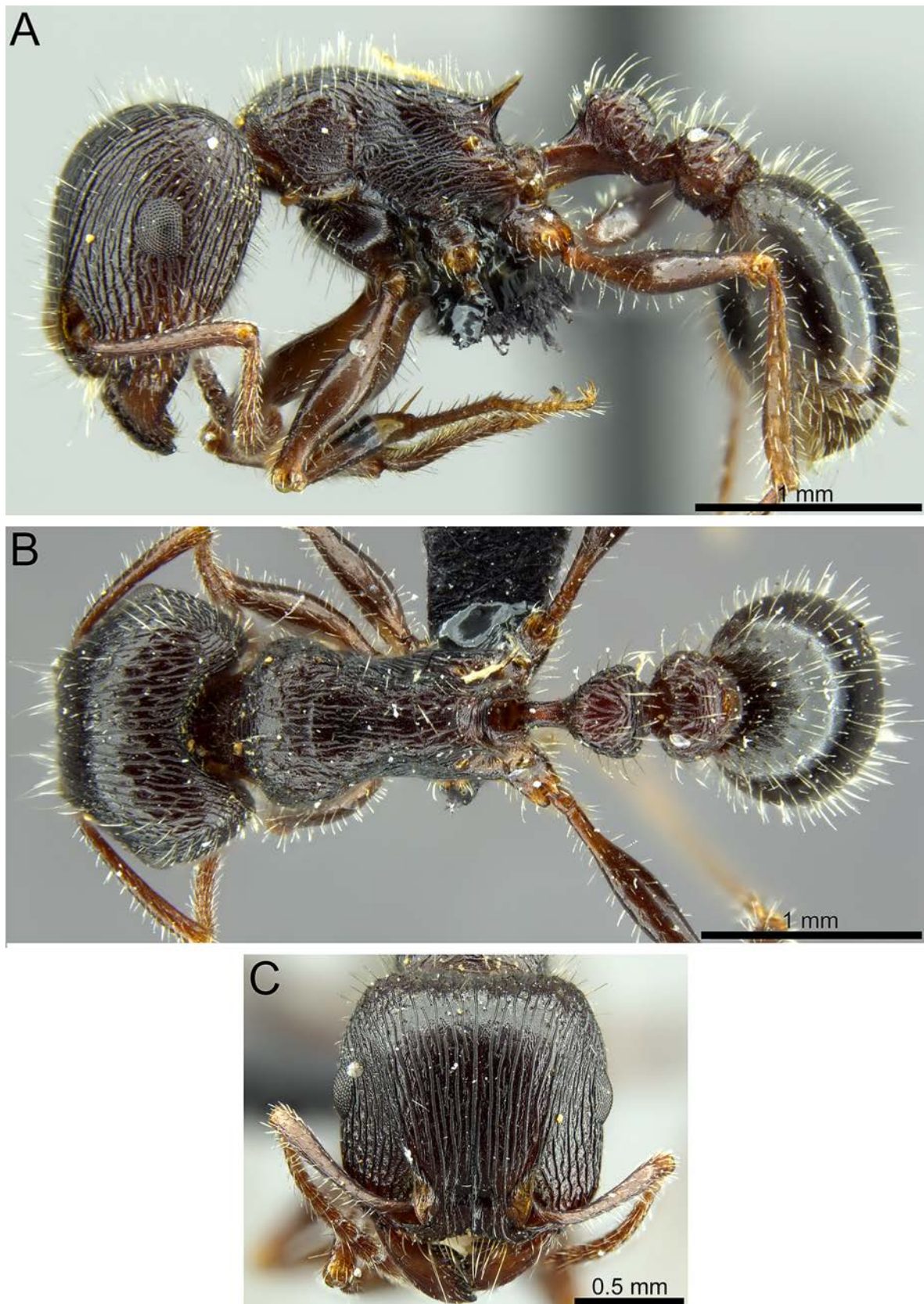
## Description

### Holotype (worker)

Mandibles with longitudinal striations. Anterior clypeal margin with extensive, semicircular indentation. Frontal carinae extending back from frontal lobes as fine ridges and ending at about level of anterior eye margin. Eyes with 16 ommatidia in longest row. Propodeum armed with pair of medium length propodeal spines, longer than basal width (PSLI 14–19). Metapleural lobes low with angled corner. Peduncle with prominent keel-shaped subpetiolar process. Petiolar node in profile nodiform, with posterior face slightly more steeply angled than anterior face; anterior face rounding onto dorsum but with slightly angled corners as seen in dorsal view. Postpetiolar node low and rounded. Dorsal surfaces of head with longitudinal striations, spaces between them with superficial reticulate ground sculpture. Dorsum of mesosoma with short longitudinal striations, with superficial ground sculpture in between them. Petiolar and postpetiolar nodes with fine reticulate sculpture overlain by irregular striations. Gastral tergite with fine, superficial reticulate pattern. All dorsal surfaces of head and body with abundant fine, erect, and short hairs. The tibia of middle and hind legs with numerous short, stout, erect hairs. Ventral surface of head with strongly developed psammophore. Colour uniformly black.

## Distribution

Known from South Africa (Western Cape, Northern Cape and Eastern Cape), where it occurs in Nama Karoo and Drakensberg Montane Grasslands.



**Fig. 16.** *Tetramorium margueriteae* Mbanyana, Robertson & Hita Garcia sp. nov. (SAM-HYM-C019839). A. Body in profile. B. Body in dorsal view. C. Head in full-face view.



*Tetramorium peringueyi* Arnold, 1926  
Figs 2B, 4C, E, G, 17, 24

*Tetramorium peringueyi* Arnold, 1926: 260.

**Diagnosis**

*Tetramorium peringueyi* is morphologically similar to *T. dichroum*, *T. margueriteae* sp. nov. and *T. brigitteae* sp. nov. They all have numerous simple, erect hairs covering the body. This species is separated from *T. dichroum* and *T. brigitteae* sp. nov. by the presence of erect hairs on the leading edges of the antennal scapes (Fig. 4C), whereas the other two species only have a sub-erect pubescence (Fig. 4D). *Tetramorium peringueyi* and *T. margueriteae* sp. nov. can be distinguished based the characters listed under *T. margueriteae* sp. nov.

**Material examined**

**Syntypes**

SOUTH AFRICA: 18 pinned workers, Northern Cape, Kimberley, 1916, Power leg. (SAMC: SAM-ENT-0011759, SAM-ENT-0011966; BMNH: CASENT0901179).

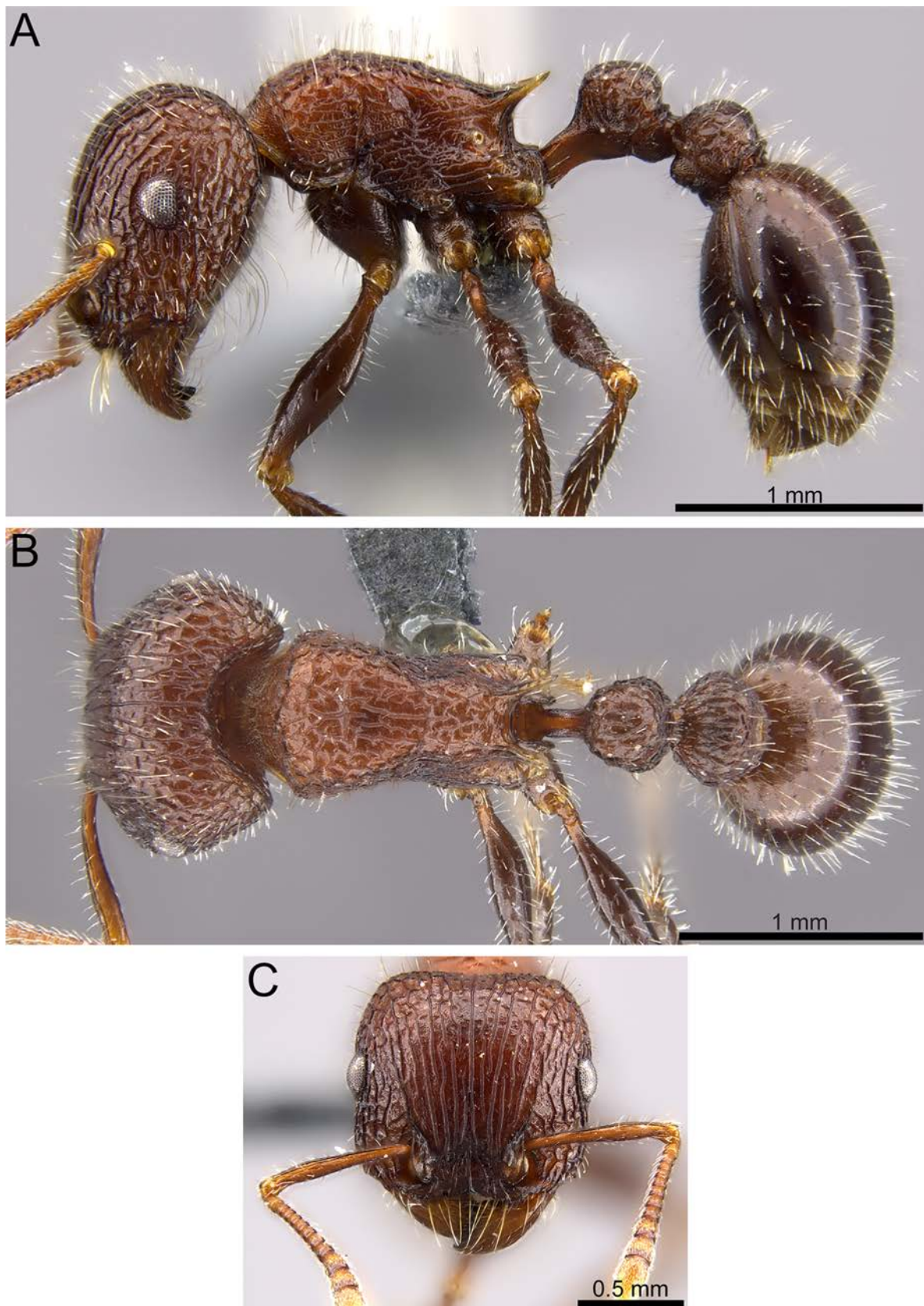
**Other material**

SOUTH AFRICA (23 pinned specimens): **Northern Cape:** Dreghorn, 26.85755° S, 20.78949° E, 862 m a.s.l., 17 Dec. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019820); Dreghorn, 26.857705° S, 20.78656° E, 855 m a.s.l., 17 Dec. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019822); Mokala National Park, Lilydale Lodge, 29.06377° S, 24.47202° E, 602 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023308); 10 mi. from Grikwastad to Prieska, 22 Oct. 1963, J.J. Cillie leg. (SAM-HYM-C015261), Postmasburg, Oryx Game Farm site 5, 28.44786° S, 22.13321° E, 1107 m a.s.l., 26 Mar. 2011, pitfall trap, mixed savannah in Gordonia Duneveld, OGF-5-2, D. Pietersen leg. (BMNH: CASENT0250873). – **Eastern Cape:** Mountain Zebra National Park, 32.14S, 25.28E, 27 Oct. 1985, H.G. Robertson leg. (SAM-HYM-C000057); Vosburg, Apr. 1954 (SAM-HYMC004121); Hopetown, 4 km E of Hopetown, Hopetown Municipal Farm, 15 Feb. 1997, B. Chambers leg. (SAM-HYM-C010850).

NAMIBIA (20 pinned specimens): SE of Windhoek, M'Bela Farm, on sand, C. Dickman leg. (SAM-HYM-C006261); SE of Windhoek, Christine Farm, on sand, C. Dickman leg. (SAM-HYM-C006264); Klein-Aus Vista, 26°39.198' S, 16°14.542' E, 1273 m a.s.l., nesting in rocky sandy soil almost in the middle of a riverbed, 3 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C026797); Klein-Aus Vista, 26°39.198' S, 16°14.542' E, 1273 m a.s.l., nesting in river sand in the middle of a dry riverbed, nest with crater of soil around entrance, 3 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C026796); 72 km from Kamanjab on C40, dry riverbed near Grootberg Village, 19°46.997' S, 14°17.357' E, 1196 m a.s.l., nesting in soil, with crater of soil around entrance, 11 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027109).

**Measurements** (worker N = 17)

HL 0.993–1.170 (1.096); HW 1.040–1.2719 (1.138); SL 0.777–0.885 (0.827); EL 0.216–0.263 (0.238); PH 0.462–0.639 (0.532); PW 0.649–0.767 (0.724); WL 1.050–1.249 (1.175); PSL 0.197–0.285 (0.238); PTH 0.354–0.433 (0.386); PTL 0.320–0.393 (0.356); PTW 0.344–0.460 (0.403); PPH 0.344–0.472 (0.400); PPL 0.256–0.393 (0.340); PPW 0.415–0.587 (0.492); OI 19–23 (21); CI 99–109 (104); SI 69–75 (73); DMI 57–65 (62); LMI 38–56 (45); PSLI 17–26 (22); PeNI 51–60 (56); LPeI 83–108 (92); DPeI 102–122 (113); PpNI 63–77 (68); LPpI 68–103 (85); DPpI 131–156 (145); PPI 118–128 (122).



**Fig. 17.** *Tetramorium peringueyi* Arnold, 1926 (CASENT0250873). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

### Distribution

*Tetramorium peringueyi* is known to occur in South Africa (Western Cape, Northern Cape and Eastern Cape) and Namibia. This species has been recorded from Drakensberg Montane Grasslands, Kalahari Xeric Savanna, Nama Karoo and Namibian Savanna Woodlands.

### Remarks

*Tetramorium peringueyi* has been found nesting in sandy soils and in deep dolerite reddish soils. The nests normally have more than one entrance. They occur in open areas at the basal parts of plants, often with a crater of soil around the entrance. This species feeds on seeds and stores them inside the nest; seed stores have been recorded within 8 cm of the soil surface. In one of the samples collected, the larvae and alates were found at about 22 cm down. Pitfall trapping, sugar baiting and hand collecting have been used to collect this species.

*Tetramorium pogonion* Bolton, 1980  
Figs 3K, 18, 24

*Tetramorium pogonion* Bolton, 1980: 249.

### Diagnosis

*Tetramorium pogonion* is the only species in the *T. solidum* group with the head broader in front of the eyes than behind (Fig. 3K).

### Material examined

#### Holotype

NAMIBIA: worker, 37 miles (60 km) W of Aus, 500 m a.s.l., 5 May 1958, E.S. Ross and R.E. Leech leg. (CASC: CASTYPE13390).

#### Paratypes

NAMIBIA: 8 pinned specimens (5 workers, 1 ♂, 2 queens), same collection data as for holotype (CASC: CASENT0270793, CASENT0270794).

### Measurements (worker N=4)

HL 0.924–0.954 (0.944); HW 0.875–0.895 (0.887); SL 0.688–0.767 (0.718); EL 0.266–0.285 (0.275); PH 0.452–0.492 (0.470); PW 0.580–0.610 (0.590); WL 0.964–0.983 (0.971); PSL 0.118–0.148 (0.135); PTH 0.275–0.295 (0.289); PTL 0.275–0.295 (0.288); PTW 0.275–0.295 (0.285); PPH 0.305–0.334 (0.325); PPL 0.256–0.275 (0.270); PPW 0.344–0.374 (0.356); OI 30–32 (31); CI 94–95 (94); SI 79–85 (81); DMI 59–63 (61); LMI 47–51 (48); PSLI 13–15 (14); PeNI 47–49 (48); LPeI 97–102 (100); DPpI 97–104 (99); PpNI 58–63 (60); LPpI 79–90 (83); DPpI 125–146 (132); PPI 120–131 (125).

### Distribution

Only known from Namibia, where it was collected in the Namib Desert and Namib Savannah Woodlands.

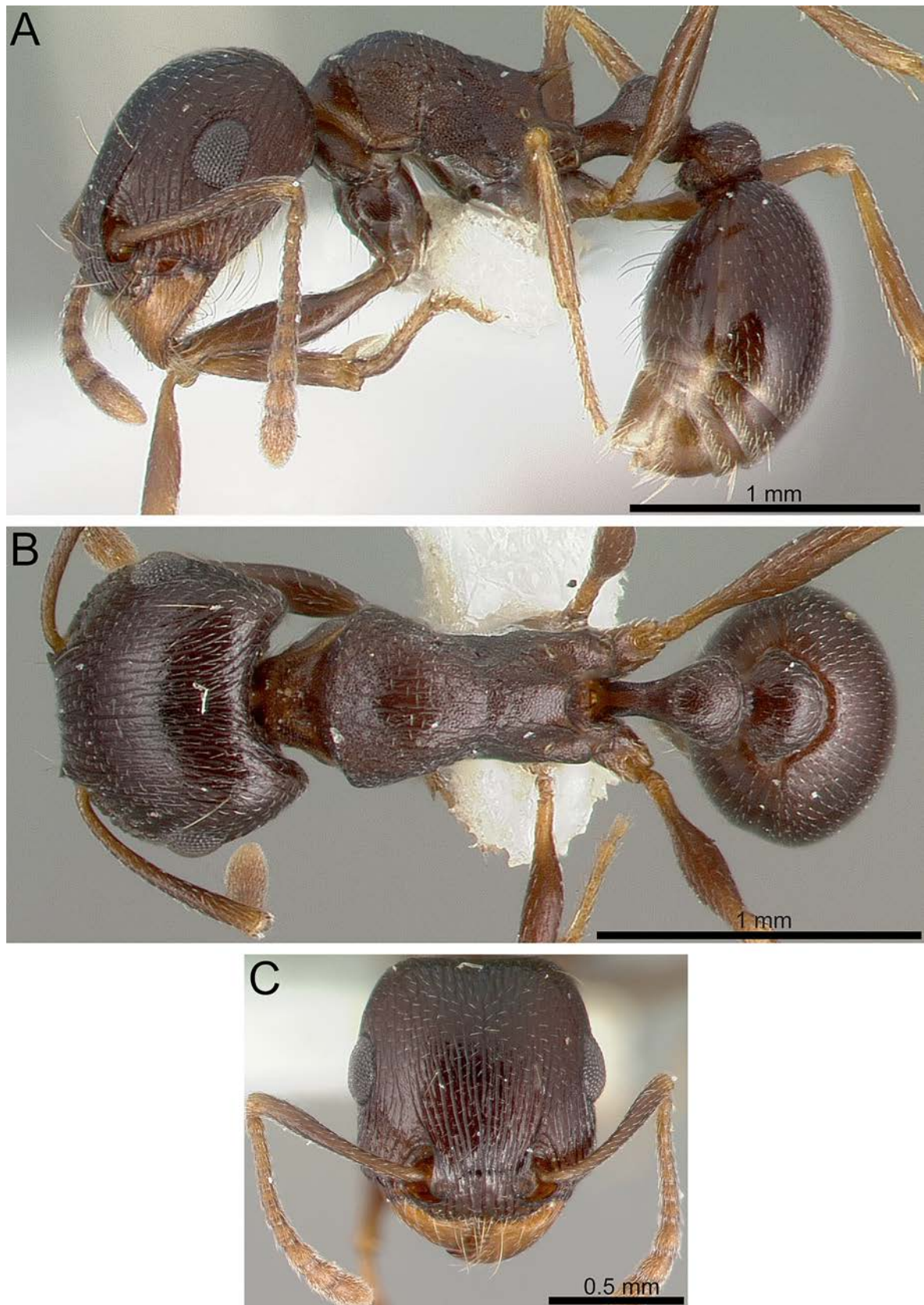
*Tetramorium rothschildi* (Forel, 1907)  
Figs 2C, 19, 24

*Triglyphothrix rothschildi* Forel, 1907: 134 (included in Bolton 1976: 334).

### Diagnosis

*Tetramorium rothschildi* is the only species in the *T. solidum* group with branched hairs (Fig. 2C, 19).





**Fig. 18.** *Tetramorium pogonion* Bolton, 1980 (CASTYPE13390 – Antweb, photographer unknown).  
A. Body in profile. B. Body in dorsal view. C. Head in full-face view.

## Material examined

### Holotype

ETHIOPIA: pinned worker, Harar, 1 Mar. 1905, Maurice de Rothschild leg. (MNHN: CASENT0915429).

### Other material

TANZANIA (27 pinned workers): Mkomazi Game Reserve, Kisima pitfall site, 4°01'30" S, 38°02'27" E, lightly wooded on red laterite soil, dominant trees *Acacia mellifera*, *A. reficiens*, *A. senegal* and *A. zanzibarica*, 2–4 Jan. 1997, G. McGavin leg. (SAM-HYM-C011140); Mkomazi Game Reserve, Ibaya, 3°58' S, 37°48' E, 18 Nov. 1994, grassland, pitfall traps, A. Russell-Smith leg. (SAM-HYM-C009595); Mkomazi Game Reserve, on top of Kisima Mountain, 4°06' S, 38°05' E, 1 Dec. 1995, nest entrance in the open (round with no crater of soil around), mountain top grassland with scattered trees and bushes, H.G. Robertson leg. (SAM-HYM-C008700); Ibaya Game Reserve, 1 Nov. 1995, H.G. Robertson leg. (CASENT0248479).

KENYA: foragers, Laikipia District, Mpala Research Centre, 0.29° N, 36.90° E, 1650 m a.s.l., 7 Oct. 1999, *Acacia* woodland, on ground, R.R. Snelling leg. (CASC: CASENT0217078); Narok, Rift Valley, Maasai Mara National Reserve, Mara River, riverbank close to Serena Lodge, 1.42478° S, 34.9099° E, 1493 m a.s.l., hand collected on the ground, savannah, FHG00030, 1 Jul. 2007, F. Hita Garcia leg. (BMNH: CASENT0764432, CASENT0764433, CASENT0764435).

GHANA: Tumu, 25 Dec. 1969, P. Room leg. (BMNH: CASENT0764594, CASENT0790132).

### Measurements (worker N=5)

HL 1.033–1.131 (1.068); HW 1.072–1.259 (1.121); SL 0.698–0.797 (0.745); EL 0.197–0.226 (0.212); PH 0.541–0.600 (0.570); PW 0.659–0.757 (0.708); WL 0.934–1.141 (1.060); PSL 0.216–0.285 (0.252); PTH 0.325–0.413 (0.378); PTL 0.315–0.374 (0.342); PTW 0.354–0.433 (0.384); PPH 0.354–0.413 (0.385); PPL 0.285–0.334 (0.299); PPW 0.393–0.492 (0.444); OI 18–21 (19); CI 102–111 (105); SI 63–70 (67); DMI 64–72 (67); LMI 48–58 (54); PSLI 21–26 (24); PeNI 53–57 (54); LPeI 85–97 (91); DPeI 107–117 (112); PpNI 56–66 (63); LPpI 73–81 (78); DPpI 133–172 (149); PPI 105–122 (116).

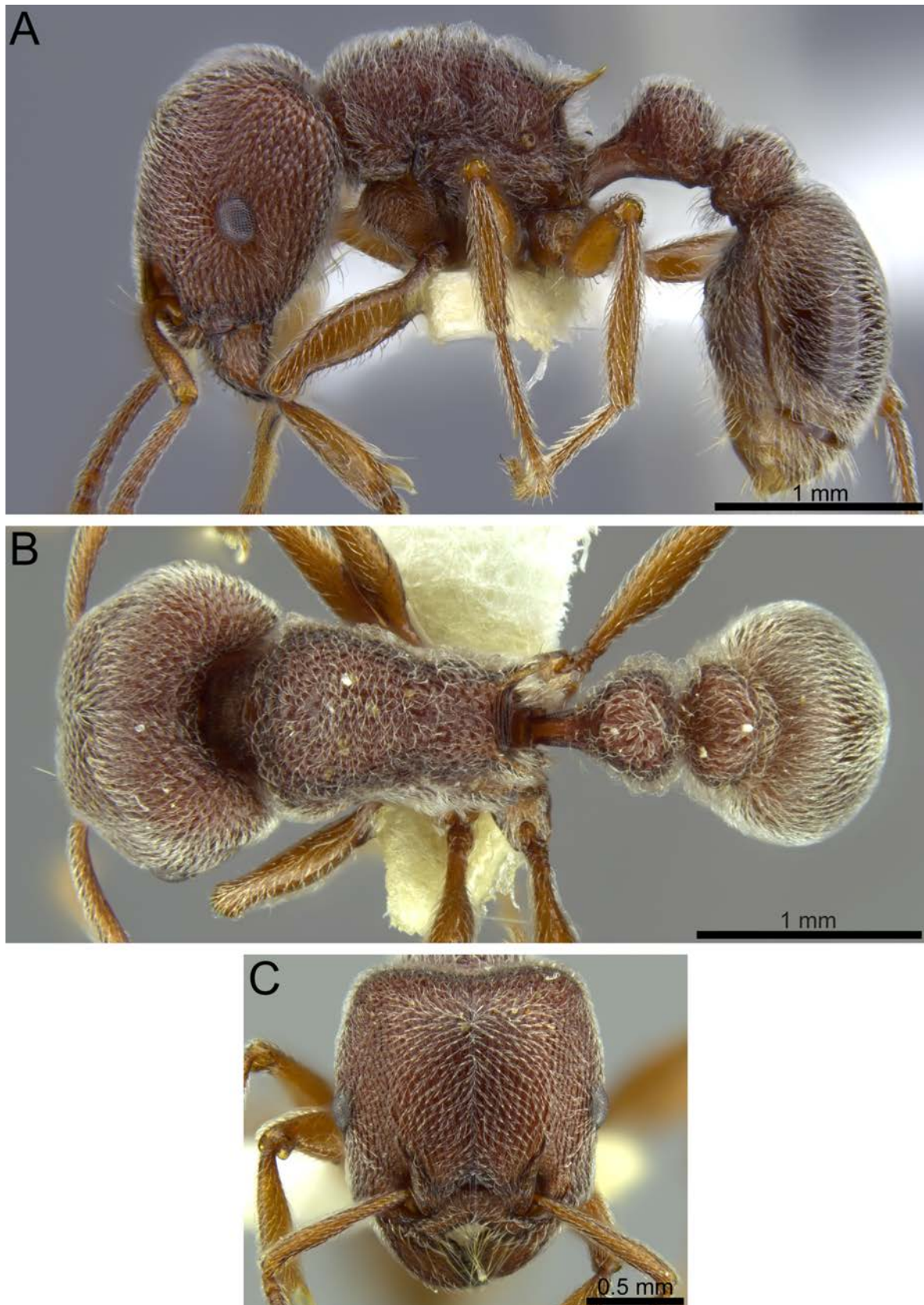
### Distribution

This species is known from Ethiopia, Tanzania, Kenya and Ghana.

### Remarks

*Tetramorium rothschildi* was first placed in the genus *Triglyphothrix* because of its branched pilosity (Bolton 1976). After Bolton (1985) revised the status of *Triglyphothrix*, he placed this species in the *T. solidum* group because of the deep indentation on the anterior clypeal margin. Despite Bolton's decision and our current treatment of this species as a member of the *T. solidum* group, we are not at all convinced that this species is a genuine member of the group. It is possible that *T. rothschildi* represents a convergent evolutionary lineage and the similarities in morphology are based on a similar granivore lifestyle. However, at present, it is not possible to address this question without a molecular phylogenetic framework. This species has been recorded from Ethiopia, Uganda, Kenya, Ghana and Tanzania. *Tetramorium rothschildi* has been found nesting in red laterite soils; nests sometimes have grass husks around the entrance. Pitfall traps and hand collecting methods have been used to collect this species.





**Fig. 19.** *Tetramorium rothschildi* (Forel, 1907) (CASENT0764434). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.



*Tetramorium rufescens* Stitz, 1923

Figs 2H, 3I, M, P, 20, 24

*Tetramorium solidum* st. *rufescens* Stitz, 1923: 163.

**Diagnosis**

The following character combination distinguishes *T. rufescens* from *T. glabratum* and *T. signatum*: dorsum of mesosoma with dense reticulate punctate sculpture and propodeal spines long and narrow (PSLI 16–23).

**Material examined**

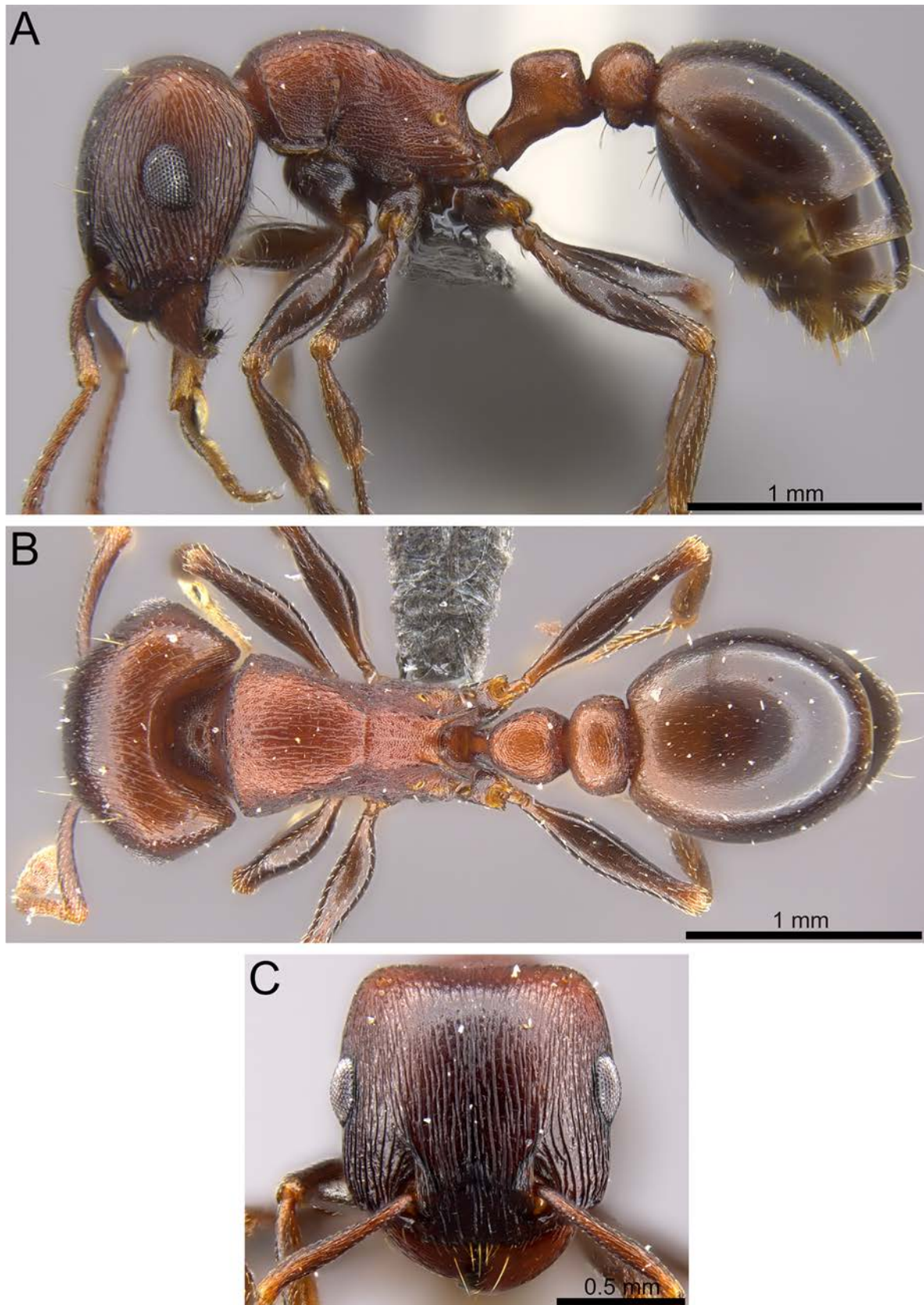
**Syntypes**

NAMIBIA: 3 pinned workers, Swakopmund, 12–19 Apr. 1911, W. Michaelsen leg. (ZMHB: FOCOL2082 to FOCOL2084).

**Other material**

NAMIBIA (148 pinned specimens): Spitzkoppe, 21°50' S, 15°11' E, 6–7 Mar. 1995, pitfall traps, E.S. Ross and A.R. Stephen leg. (CASC: CASENT-0217976 (compared with type)); 61.2 km S of Gobabis on C20, at intersection of C20 and D1790, 22°56.806' S, 18°44.681' E, 1353 m a.s.l., nesting in red sandy soil, 17 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027008); Porcupine Camp Site, 2.8 km W of Kamanjab, 19°38.448' S, 14°45.980' E, 10 Apr. 2011, nesting in loam soil, entrance in the open, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C026891); Spitzkoppe, 50 mi. E of Hentiesbaai, 950 m a.s.l., 13 Oct. 1967, pitfall traps, H.G. Robertson leg. (SAM-HYM-C007990); Spitzkoppe, 21°50' S, 15°11' E, 6–7 Mar. 1995, pitfall traps, H.G. Robertson leg. (SAM-HYM-C007993); Otjozondju, Otjiamongo, 21.60° S, 16.94° E, 1495 m a.s.l., 8 May 2007, C. Grohmann leg. (SAM-HYM-C027188); Ongongo (= Warmquelle), 19°10' S, 13°49' E, foraging on rocky ground, 10 Mar. 1995, H.G. Robertson leg. (SAM-HYM-C008141); Epupa Falls, 17°00' S, 13°15' E, open rocky savanna, H.G. Robertson leg. (SAM-HYM-C009147, SAM-HYM-C009089); Spitzkoppe, 21°50' S, 15°11' E, 6–7 Mar. 1995, pitfall traps, H.G. Robertson leg. (SAM-HYM-C007998); Gamsberg Pass, 23.16° S, 16.20° E, 7 Sep. 1987, H.G. Robertson leg. (SAM-HYM-C000496); Naukluft PK, Mirabib, 12 Mar. 1988, collected from nest, H.G. Robertson leg. (SAM-HYM-C001039); Namib Nuakluft Park, Ganab Camp Site, 13 Mar. 1986, collected from nest, H.G. Robertson leg. (SAM-HYM-C001044); SE of Windhoek, M'Bela Farm, on sand, C. Dickman leg. (SAM-HYM-C006260, SAM-HYM-C006263, SAM-HYM-C006265); Hobatere, 15 Mar. 1995, open mopane savanna on granite derived gravelly soils, H.G. Robertson leg. (SAM-HYM-C009193); Hobatere (3 km from gate), Boomrivier, Luderitz District, 28°01' S, 17°04' E, 13–26 Nov. 1992, pitfall traps, E. Marais leg. (SAM-HYM-C027181); Daberas, Diamond Area 1, 28°12' S, 16°49' E, pitfall trap, 14–29 Sep. 1994, E. Marais leg. (SAM-HYM-C027184); miscellaneous foragers, Opuwo, 3 km from Opuwo Junction on C35, open savanna on red clay soils, pointed termite mounds, 14 Mar. 1995, H.G. Robertson leg. (SAM-HYM-C009186); Klein-Aus Vista, rocky north-facing slope with low shrubs and grass, 26°39.221' S, 16°14.532' E, 1325 m a.s.l., soils shallow and gravelly, 5 Apr. 2011 (SAM-HYM-C027006); foragers, Ai-Ais, 27°55' S, 17°30' E, 19 Mar. 1995, on gravel/bare ground outside bungalow, H.G. Robertson leg. (SAM-HYM-C009267); Namib Desert, Skeleton Coast, 10 Aug. 1982, collected from a gravel plain, desert, A.C. Marsh leg. (CASC: CASENT0764595, CASENT0764596); Karibib, Erongo, Central Namib Desert 2010 site 33, 22.13598° S, 14.86326° E, 596 m a.s.l., hand collected, desert, Central Namib vegetation, 28 Oct. 2010, P. Hawkes, J. Fisher, J. Irish and R. Scholtz leg. (CASC: CASENT0250971).

SOUTH AFRICA: **Northern Cape**: road from Klein Pella to Orange River, 28.98596° S, 18.99436° E, 615 m a.s.l., 15 Dec. 2007, Eastern Gariep plain desert with deep soils and *Euphorbia*, found nesting at base of grass tuft, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019958); Hopetown Municipal



**Fig. 20.** *Tetramorium rufescens* Stitz, 1923 (CASENT0250852). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

Farm, Hopetown District, 4 km E of Hopetown, 15 Feb. 1997, B. Chambers leg. (SAM-HYM-C011115); Brandvlei, 23 Nov. 1963 (SAM-HYM-C017177); Postmasburg, Oryx Game Farm site 5, pitfall trap, 28.44786° S, 22.13321° E, 1107 m a.s.l., mixed savannah in Gordonias Duneveld, 26 Mar. 2011, D. Pietersen leg. (CASC: CASENT0250875); Postmasburg, SIO-site 4, 27.80767° S, 22.94291° E, 1170 m a.s.l., pitfall trap, ephemeral river bed and adjacent vegetation in Olifantshoek Plains Thornveld, 19 Feb. 2015, P. Hawkes and J. Fisher leg. (CASC: CASENT0250852). – **Eastern Cape:** Grahamstown, 19 Nov. 1965, A.J. Prins leg. (SAM-HYM-C019173).

#### Measurements (worker N = 13)

HL 0.983–1.200 (1.065); HW 0.954–1.151 (1.021); SL 0.708–0.856 (0.772); EL 0.266–0.325 (0.291); PH 0.393–0.570 (0.460); PW 0.610–0.777 (0.678); WL 1.003–1.141 (1.101); PSL 0.167–0.236 (0.206); PTH 0.315–0.403 (0.348); PTL 0.275–0.325 (0.305); PTW 0.295–0.425 (0.343); PPH 0.315–0.418 (0.362); PPL 0.226–0.291 (0.259); PPW 0.369–0.521 (0.433); OI 27–30 (29); CI 91–100 (96); SI 73–81 (76); DMI 57–69 (62); LMI 36–50 (42); PSLI 16–23 (19); PeNI 46–61 (50); LPeI 78–100 (88) DPeI 97–127 (112); PpNI 59–75 (64); LPpI 59–77 (72); DPpI 154–188 (167); PPI 121–133 (127).

#### Distribution

*Tetramorium rufescens* is known from South Africa and Namibia.

#### Remarks

The description of this species matches that of Bolton (1980), except for colour. We observed some variation in the specimens examined, ranging from red to light brown, in those collected at certain localities in South Africa (Klein Pella) and Namibia (Kamanjab, Luderitz District, Daberas, Hobatere, Epupa Falls). This species has been recorded from the Drakensberg Montane Grasslands, Kalahari Xeric Savanna, Nama Karoo, Namib Desert, Namibian Savanna Woodlands and Succulent Karoo.

#### *Tetramorium setuliferum* Emery, 1895

Figs 2F, 3A, 21, 24

*Tetramorium squamiferum* Forel, 1894: 80 (attributed to Emery; nomen nudum, see Wheeler 1922: 903; included in Bolton 1980: 250).

*Tetramorium setuliferum* Emery, 1895: 36 (included in Bolton 1980: 250).

*Tetramorium setuliferum* var. *cucalense* Santschi, 1910: 356 (included in Bolton 1980: 250).

*Tetramorium setuliferum* var. *triptolemus* Arnold, 1917: 292 included in Bolton 1980: 250).

#### Diagnosis

*Tetramorium setuliferum* is morphologically similar to *T. clunum*. The two species are separated by the characters listed under *T. clunum*.

#### Material examined

##### Type material

SOUTH AFRICA: syntypes of *Tetramorium setuliferum* Emery, 1895: 2 pinned workers, Orange Free State, Bethlehem, Weitzecker leg. (MSNG: CASENT0904839).

ANGOLA: syntypes of *Tetramorium setuliferum* var. *cucalense* Santschi, 1910: 1 pinned worker, Cucala, Benguela, J. Cruchet leg. (RMCAENT000017786); 1 pinned worker, Cucala near Caconda, Benguela, 31 Dec. 1910, Santschi leg. (NHMB: CASENT0915077; MNHN: CASENT0915425).



ZAMBIA: syntype of *Tetramorium setuliferum* var. *triptolemus* Arnold, 1917: 1 pinned worker, “N. Rhod.” according to label, Lusakas, Oct. 1913, G. Arnold leg. (BMNH: CASENT0901177).

#### Other material

SOUTH AFRICA (241 pinned specimens): **Northern Cape:** Cullinan Farm, 26.33562° S, 22.61217° E, 962 m a.s.l., 19 Dec. 2007, nest with crater of soil around the entrance, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019898); Cullinan Farm, 26.34087° S, 22.6083° E, 977 m a.s.l., 19 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019870); Mokala National Park, 29.14467° S, 24.28437° E, 1185 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023299); Mokala National Park, 29.06377° S, 24.47202° E, 1124 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023300); Mokala National Park, 29.16644° S, 24.34299° E, 1262 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023301). – **North West:** Pilanesberg National park, Plot 1 (Mankwe Way), 25°16' S, 27°08' E, 20–26 Oct. 1998, pediment grassland, C.L. Parr leg. (SAM-HYM-C016874). – **KwaZulu-Natal:** Thurlow Game Park, Midmar, Howick, 29°32'20" S, 30°10'0" E, nest in grass roots, rocky grassland, loam substrate, gentle hillside, 4 Jan. 2005, H. Adie leg. (SAM-HYM-C018292); Mkuze Game Reserve, Mantamu rest camp, 27.36° S, 32.13° E, 8 Dec. 1986, from a nest, H.G. Robertson leg. (SAM-HYM-C000256); foragers, Sodwana Bay, coastal evergreen forest, sand dunes, 27°33'00" S, 32°40'00" E, 15 Feb. 1999, on ground, P.S. Ward leg. (SAM-HYM-C016524); Weza, 30.35° S, 29.45° E, 2 Dec. 1986 (SAM-HYM-C000197); Good Hope Estate, 10.1 km 281° W of Boston, 29°41.7' S, 29°55.4' E, 1500 m a.s.l., 25–30 Aug. 1998, B.L. Fisher leg. (CASC: CASENT0100777, CASENT0100778, CASENT0100780). – **Gauteng:** Primier Mine, Cullinan, 10 Feb. 2001, P. Hawkes leg. (SAM-HYM-C016219); Wits University, near nursery, 26.11° S, 28.02° E, 17 Feb. 1988, collected from nest, H.G. Robertson leg. (SAM-HYM-C000966); Jan Van Riebeeck, Johannesburg, 26.095° S, 28.00° E, 24 Nov. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000761); foragers, Farmall, Randburg, 25°59' S, 27°58' E, 6 Aug. 1995, grassland, H.G. Robertson leg. (SAM-HYM-C008221); Kloofendal, Roodeport, 12 Oct. 1996, A. Leroy leg. (SAM-HYM-C009659); Pretoria, 22°43' S, 28°15' E, 29 Apr. 1990, B.J. Kotzie leg. (SAM-HYM-C011557). – **Limpopo:** Soutpansberg 55, 23°2'3" S, 29°25'45" E, 12 Aug. 2007, A. Heiduk leg. (SAM-HYM-C019677); Soutpansberg 56, 23°1'55" S, 29°25'41" E, 19 Aug. 2007, A. Heiduk leg. (SAM-HYM-C019678), Landbou Proef Plaas, Messina, 28 Apr. 1969, A.J. Prins leg. (SAM-HYM-C015070); Voorspoed, Naboomspruit, 29 Apr. 1969, A.J. Prins leg. (SAM-HYM-C015077); Groblersdal, Mooiuitsig, 29 Apr. 1969, A.J. Prins leg. (SAM-HYM-C015437); Dendron, 23°23'0" S, 29°20'0" E, 6 Dec. 1966, Dr Karney leg. (SAM-HYM-C015445); Kruger National Park, near Satara, Marenja plots, 24°32' S, 31°46' E, 320 m a.s.l., Jan. 2002, *Acacia nigrescens* savannah, pitfall trap, C.L. Parr leg. (SAM-HYM-C023460); Kruger National Park, near Satara, Satara plots, 24°24' S, 31°45' E, 300 m a.s.l., Jan. 2002, *Acacia nigrescens* savannah, pitfall trap, C.L. Parr leg. (SAM-HYM-C023461); Kruger National Park, near Mopane, Dzombo plots, 23°26' S, 31°22' E, 360 m a.s.l., Jan. 2002, *Acacia nigrescens* savannah, pitfall trap, C.L. Parr leg. (SAM-HYM-C023462); Kruger National Park, near Satara, N'wanetsi plots, 24°26' S, 31°53' E, 240 m a.s.l., Jan. 2002, *Acacia nigrescens* savannah, pitfall trap, C.L. Parr leg. (SAM-HYM-C023463); Mpszema, 22.56° S, 30.11° E, 20 Oct. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000645); Umbabat Rural Facility near Acornhoek, 26 Sep. 1990, M. Villet leg. (SAM-HYM-C002634); Letaba Estate, 23.51° S, 30.18° E, 9 Feb. 1988, collected from nest, H.G. Robertson leg. (SAM-HYM-C000933); Dendron, 23°23'0" S, 29°20'0" E, 9 Feb. 1966, Dr Karney leg. (SAM-HYM-C015446); 7 km W of Giyani, 7 km NW of Letaba River, 23.17° S, 30.37° E, 18 Oct. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000624); Roschdraai Farm, NE of Vaalwater, 24.12° S, 28.17° E, 13 Jun. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000429). – **Mpumalanga:** Vygenhoek, 25.03323° S, 30.16407° E, 1401 m a.s.l., 15 Dec. 2007, P. Hawkes and J. Fisher leg. (SAM-HYM-C024385); Nelspruit, Dumas, 23 Apr. 1969, A.J. Prins leg. (SAM-HYM-C015312); Sabie Sand Game Reserve, 24°46' S, 31°22' E, 23 Jun. 1992, J. Swart leg. (SAM-HYM-C006341). – **Orange Free State:** Edenville,

27°33'00" S, 27°41'00" E, Mar. 1967, Dr Karney leg. (SAM-HYM-C015185); Bothaville, 8 Jul. 1988, A.J. Prins and A. Roux leg. (SAM-HYM-C001757). – **Eastern Cape:** Stutterheim, 3 May 1993, W. Coetzer leg. (SAM-HYM-C006786).

**NAMIBIA** (60 pinned specimens): miscellaneous foragers, just outside Opuwo, open savanna on white clay soil, 14 Mar. 1995, H.G. Robertson leg. (SAM-HYM-C009176); foragers, Waterberg Rest Camp, bare ground outside bungalow, 16 Mar. 1995, H.G. Robertson leg. (SAM-HYM-C009241); Waterberg area, Klarwater Farm, on sand, C. Dickman leg. (SAM-HYM-C006268); Avis Dam, Windhoek, 22°34.925' S, 17°08.134' E, nest in soil, entrance in open, 14 Apr. 2011 (SAM-HYM-C026798); Porcupine Camp, 8 km W of Kamanjab, 19°38.950' S, 14°45.952' E, 10 Apr. 2011, nesting in deep fine red sandy soil, nest entrance with crater of soil around, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027093); Porcupine Camp, 8 km W of Kamanjab, 19°38.969' S, 14°45.971' E, 10 Apr. 2011, nesting in sandy soil, nest entrance in the open with crater of soil around, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027094); Zelda Guest Farm site 1, 22°17.311' S, 19°49.199' E, 16 Apr. 2011, nest in sandy soil, entrance in the open, with crater of soil around it, males collected from the nest, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027096); Zelda Guest Farm site 4, 22°16.596' S, 19°49.701' E, 16 Apr. 2011, nest in soft sandy soil, entrance at base of grass tuft, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027097); 61.2 km S of Gobabis, C20 site 3, 22°56.806' S, 18°44.681' E, 17 Apr. 2011, nest in red sandy soil, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027099).

**BOTSWANA:** Nata Saltpan, 2 km into saltpan, 1 Dec. 1986, R.J. Nefdt leg. (SAM-HYM-C000295); Madikwe Game Reserve, Tshwene *Combretum apiculatum* mountain field, 24°44'43" S, 26°17'14" E, Jan. 2001, N. Govender leg. (SAM-HYM-C016269).

**ZIMBABWE:** Rusape, 18.32° S, 32.08° E, 5 Dec. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000817); Kyle View Chalets, 20.05° S, 31.01° E, 30 Nov. 1987, collected from nest, H.G. Robertson leg. (SAM-HYM-C000770); Noga Island Okavango Delta, sand, 23 Sep. 1991, R. Newman leg. (SAM-HYM-C005634); Khami Ruins, 14 mi. W of Bulawayo, 22. Mar. 1958, 1275 m a.s.l., E.S. Ross and R.E. Leech leg. (CASC: CASENT0270795); Oshikongo, 3200 ft (= 975 m) a.s.l., 9 Mar. 1970, E.S. Ross leg. (CASC: CASENT0270796).

**ZAMBIA:** Gwabe Camp near Chirundu, 20 Dec. 1986, R.J. Nefdt leg. (SAM-HYM-C007280); Lusaka, Xanadu Farm, in soil about 10 cm deep, Miomba woodland, legume-like seeds in nest, 2 Jan 1987, R.J. Nefdt leg. (SAM-HYM-C000298); Choma, 16°47.72' S, 26°56.30' E, 1330 m a.s.l., 3 Dec. 2005, Fisher *et al.* leg. (CASC: CASENT0066874).

**SWAZILAND:** foragers, 5 km NE of Forbes Reef, grassland, 26°8' S, 31°8' E, 19 Feb. 1999, on ground, P.S. Ward leg. (SAM-HYM-C016538).

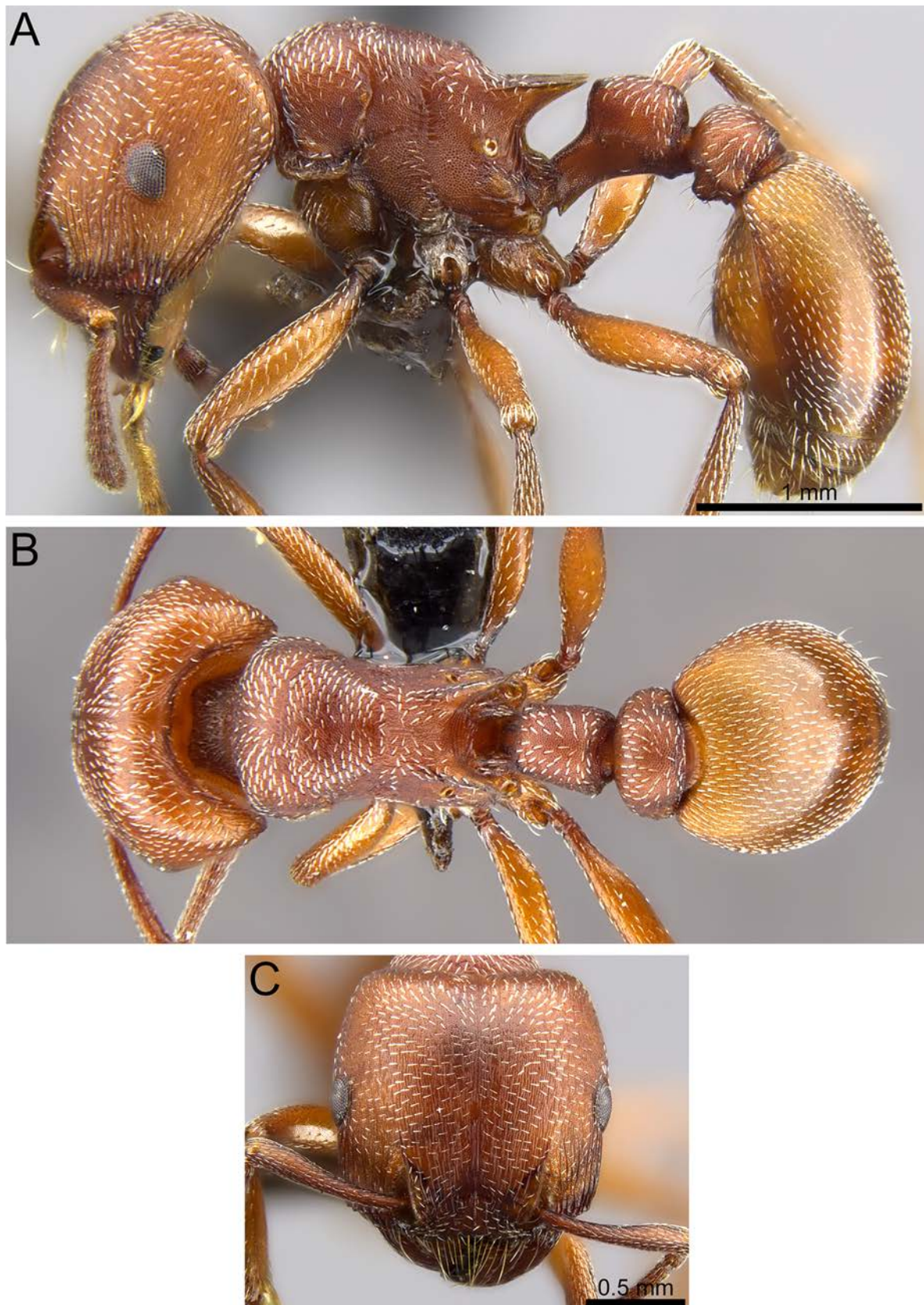
#### **Measurements** (worker N = 13)

HL 0.964–1.210 (1.114); HW 0.969–1.259 (1.151); SL 0.698–0.846 (0.803); EL 0.220–0.275 (0.254); PH 0.433–0.561 (0.486); PW 0.610–0.799 (0.724); WL 0.983–1.210 (1.118); PSL 0.197–0.285 (0.289); PTH 0.266–0.403 (0.362); PTL 0.293–0.388 (0.337); PTW 0.329–0.433 (0.391); PPH 0.329–0.408 (0.364); PPL 0.197–0.310 (0.279); PPW 0.401–0.600 (0.540); OI 20–24 (22); CI 100–106 (103); SI 66–74 (70); DMI 62–70 (65); LMI 41–50 (44); PSLI 21–31 (26); PeNI 51–57 (54); LPeI 79–108 (93); DPeI 103–147 (117); PpNI 66–79 (75); LPpI 74–87 (77); DPpI 167–212 (194); PPI 122–143 (138).

#### **Distribution**

This is a widespread and common species in savanna and grassland regions of southern Africa, including South Africa (Western Cape, Northern Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo,





**Fig. 21.** *Tetramorium setuliferum* Emery, 1895 (MCZ\_ENT00512567). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.



Gauteng, North West, Free State), Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Tanzania, Zaire, Zambia and Zimbabwe. It has been recorded from the following ecoregions: Angolan Mopane Woodlands, Drakensberg Montane Grasslands, Highveld Grasslands, Kalahari Xeric Savanna, Kalahari *Acacia–Baikiaea* Woodlands, Maputaland-Pondoland Bushland and Thickets, Nama Karoo, Namibian Savanna Woodlands, Southern Africa Bushveld, Southern Africa Mangroves, Southern Miombo Woodlands, Succulent Karoo, Zambezian and Mopane Woodlands, Zambezian Flooded Grasslands.

### Remarks

This species has been collected in forest clearings, in weedy areas, in savanna on white clay soil, dry forest savanna, Thornveld savanna, Kimberley Thornveld, Miombo woodland, riverine-grassveld, old tobacco fields, sandy soil areas dominated by shrubs, and in citrus orchards. *Tetramorium setuliferum* normally nests in sandy to loamy soils, with nest entrances found in open areas. Circles of grass seed husks, piles of small stones or scattered soil particles have been found around nest entrances. Seeds are regularly found in nests. Reproductive forms have been collected from nests between October and February. Collected using pitfall traps, tuna baits, and sugar baits.

*Tetramorium signatum* Emery, 1895  
Figs 3E, 4A, 22, 24

*Tetramorium solidum* var. *signatum* Emery, 1895: 35 (included in Bolton 1980: 251).

*Tetramorium solidum* subsp. *lugrubre* Forel, 1910: 425 (included in Bolton 1980: 251).

*Tetramorium solidum* var. *grootensis* Forel, 1913: 118 (included in Bolton 1980: 251).

*Tetramorium solidum* var. *tuckeri* Arnold, 1926: 259 (included in Bolton 1980: 251).

### Diagnosis

*Tetramorium signatum* is similar to *T. rufescens* and *T. pogonion*. *Tetramorium pogonion* is relatively smaller compared to the other two species with relatively larger eyes ( $OI > 30$ ) and a different head shape (Fig. 3K). *Tetramorium signatum* and *T. rufescens* can be separated on basis of the sculpture pattern on the dorsum of mesosoma. In *T. signatum*, the dorsum of the mesosoma has distinct longitudinal or irregular rugulae (Fig. 4A), whereas in *T. rufescens*, the dorsum of the mesosoma has a dense reticulate punctation and sometimes with a few short faint longitudinal costulae (Fig. 4B).

### Material examined

#### Type material

SOUTH AFRICA: syntype of *Tetramorium solidum* var. *signatum* Emery, 1895: 1 pinned worker, Western Cape, Matjiesfontein, E. Simon leg. (MSNG: CASENT0904841); syntypes of *Tetramorium solidum* var. *grootensis* Forel, 1913: 1 pinned queen, 1 pinned ♂, Eastern Cape, Willowmore, H. Brauns leg. (BMNH: CASENT0901188; MHNG: CASENT0909156).

ANGOLA: syntype of *Tetramorium solidum* subsp. *lugrubre* Forel, 1910: 1 pinned worker, Mossamedes, de Picard leg. (MHNG: CASENT0909157).

NAMIBIA: syntypes of *Tetramorium solidum* var. *tuckeri* Arnold, 1926: 1 pinned queen, 1 pinned worker, Brehdon, 20 Dec. 1915, R.W.E. Tucker leg. (BMNH: CASENT0901189; SAMC: SAM-ENT-0011762).

#### Other material

SOUTH AFRICA (262 pinned specimens): **Northern Cape:** Dregghorn, 26.85755° S, 20.78949° E, 862 m a.s.l., 17 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019926); Dregghorn, 26.85755° S, 20.78949° E, 862 m a.s.l., 17 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019927); Cullinan Farm, 26.34087° S, 22.61083° E, 977 m a.s.l., 19 Dec. 2007, N. Mbanyana

and H.G. Robertson leg. (SAM-HYM-C019928 to SAM-HYM-C019932); Cullinan Farm, 26.34087° S, 22.61083° E, 977 m a.s.l., 19 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019933 to SAM-HYM-C019937); Cullinan Farm, 26.85770° S, 20.78656° E, 855 m a.s.l., 17 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019938); between Askham and Vansylsrus, 27.03322° S, 21.09746° E, 872 m a.s.l., 18 Dec. 2007, nest entrance with crater of soil around entrance, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019939); Cullinan Farm, 26.33562° S, 22.61217° E, 962 m a.s.l., 17 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019940); Cullinan Farm, 26.34087° S, 22.61083° E, 977 m a.s.l., 19 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027128); Loeriesfontein (SAM-HYM-C019277); Loeriesfontein (SAM-HYM-C019283); Rietfontein Oos (SAM-HYM-C019284); road between Karsten Farms and Goodhouse, Kokerboom site, Klein Pella, 29.06211° S, 18.97985° E, 832 m a.s.l., 16 Dec. 2007, Gariep rocky desert with Kokerboom and *Euphorbia*, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019946, SAM-HYM-C019954); road between Karsten Farms and Goodhouse, Kokerboom site, Klein Pella, 29.03527° S, 18.97662° E, 678 m a.s.l., 16 Dec. 2007, east desert with large *Euphorbia* trees, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019955); road between Karsten Farms and Goodhouse, *Euphorbia* site, Klein Pella, 29.03527° S, 18.97662° E, 678 m a.s.l., 16 Dec. 2007, east Gariep desert with large *Euphorbia*, soil around the entrance, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019956); road from Klein Pella to Orange River, 28.95083° S, 18.199153° E, 449 m a.s.l., Gariep plain desert, 16 Dec. 2007, sandy soil with gravel, shallow soil, found foraging on ground, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019957); Goegab Nature Reserve, Jul. 1998, U. Kruger leg. (SAM-HYM-C013303); Brandvlei, 30°31' S, 20°29' E, 28 May 1986, A.J. Prins leg. (SAM-HYM-C001716); Dreghorn near Chalets, 26.85770° S, 20.78656° E, 855 m a.s.l., 17 Dec. 2007 (SAM-HYM-C019904, SAM-HYM-C019905, SAM-HYM-C019907, SAM-HYM-C019921); Dreghorn, 26.85755° S, 20.78949° E, 862 m a.s.l., 17 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019922, SAM-HYM-C019925); Hopetown, 4 km E of Hopetown, Hopetown Municipal Farm, 15 Feb. 1992, B. Chambers leg. (SAM-HYM-C010856); road between Karsten Farms and Goodhouse, 29.06211° S, 18.97985° E, 832 m a.s.l., 16 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019868); Mokala National Park, Lilydale Lodge, 29.06377° S, 24.47202° E, 602 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023331); Tankwa Karoo National Park, 32.17430° S, 19.97382° E, 602 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023332, SAM-HYM-C023324); Mokala National Park, Lilydale Lodge, 29.06377° S, 24.47202° E, 602 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson (SAM-HYM-C023310); Mokala National Park, 29.14467° S, 24.28437° E, 1185 m a.s.l., 12 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023311); Kimberley (SAM-HYM-C004019); Melton Wold, 31.46626° S, 22.72004° E, 1332 m a.s.l., 9 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023315, SAM-HYM-C023316); Tankwa Karoo National Park, 32.17430° S, 19.97382° E, 490 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023317, SAM-HYM-C023318); Melton Wold, 31.46741° S, 22.721550° E, 1333 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023320); Tankwa Karoo National Park, 32.17430° S, 19.97382° E, 602 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023322, SAM-HYM-C023325, SAM-HYM-C023327, SAM-HYM-C023328); Dreghorn near Chalets, 26.85770° S, 20.78656° E, 855 m a.s.l., 17 Dec. 2007, nest in soil underground, nest entrance at base of grass tuft, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C024391); Kortkop Farm, near Strydenburg, 30°09' S, 23°44' E, 17 Jun. 1995, pitfall trap, Karoo vegetation, B. Chambers leg. (SAM-HYM-C008768); Tankwa Karoo National Park, 32.21512° S, 20.07671° E, 522 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023321); Tankwa Karoo National Park, 32.24758° S, 20.09660° E, 490 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023319); Tankwa Karoo National Park, 32.42325° S, 19.98843, 379 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023326); Kalahari Gemsbok National Park, Gemsbokplain waterhole and dung, 26°09.1' S, 20°31.8' E, 935 m a.s.l., 21 Nov. 1997, M. Uhlig leg.

(SAM-HYM-C011358); Namakwaland, Gamsberg 2009 transect v4-s7-t1, 29.22153° S, 18.97957° E, 959 m a.s.l., hand collected, 5 Sep. 2009, P. Hawkes and J. Fisher leg. (CASC: CASENT0250961). – **Western Cape:** Ladismith (SAM-HYM-C019279); Onder-Downs (SAM-HYM-C019282); 33 km from Prince Albert Road on Leeu Gama Road, 32°56' S, 21°59' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009330); 40 km from Seekoegat on Prince Albert Road, 33°10' S, 22°10' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009331); 2 km from Prince Albert Road on Leeu Gamka road, 33°11' S, 22°02' E, 10–19 Oct. 1996, T.E. Tshiguvho leg. (SAM-HYM-C009332); Josephskraal, 33.04182° S, 20.72157° E, 896 m a.s.l., 16 Apr. 2008, Koedoesberge-Moordenaars Karoo, nesting in soil under rock, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020573); Abrahamskraal, 32.92874° S, 22.00435° E, 522 m a.s.l., 12 Apr. 2008, drainage line with deep soils soft at about 20 cm and after that harder and compacted, nesting in soil under rock, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020506, SAM-HYM-C020510, SAM-HYM-C020513); Abrahamskraal, 32.93011° S, 22.00949° E, 522 m a.s.l., 12 Apr. 2008, rocky ridges with sparsely distributed shrubs, shallow soil, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020330, SAM-HYM-C020335, SAM-HYM-C020344); Gamkaskloof, 33°21'48" S, 21°37'39" E, 24 Oct. 2005, Nama Karoo rocky hillside, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019028); Gamkaskloof, 33°21'48" S, 21°37'39" E, 25 Oct. 2005, Nama Karoo rocky hillside, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C019033); Vêrgenoeg, 33.24421° S, 21.47939° E, 670 m a.s.l., 10 Apr. 2008, Koedoesberge-Moordenaars Karoo, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020400); Vêrgenoeg, 33.24467° S, 21.47597° E, 670 m a.s.l., 10 Apr. 2008, Koedoesberge-Moordenaars Karoo, east-facing rocky slope, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020431); Josephskraal, 33.04182° S, 20.72157° E, 896 m a.s.l., 16 Apr. 2008, Koedoesberge-Moordenaars Karoo, found nesting in deep soil on elevated flood plain, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020469, SAM-HYM-C020452); Vrede, Anysberg Nature Reserve, Karoo vegetation, 33°28'00" S, 20°35'00" E, 27 Feb. 1999, foraging in front of a bungalow, H.G. Robertson leg. (SAM-HYM-C013034); Vrede, Anysberg Nature Reserve, 33°28'00" S, 20°35'00" E, 27 Feb. 1999, Karoo vegetation, foraging on sandy soils near river (SAM-HYM-C013039); Prince Albert, Tierberg Research Station, 33.168833° S, 22.270111° E, 740 m a.s.l., 14 Feb. 2006, succulent Karoo, pitfall trap, Iimbovane Outreach Project, B. Braschler leg. (SAM-HYM-C024974); Vêrgenoeg, 33.23126° S, 21.46445° E, 630 m a.s.l., 10 Apr. 2008, Koedoesberge-Moordenaars Karoo, Karoo plain with succulent components mainly mesems (Aizoaceae), nest with at least 15 entrances covering about half a meter square, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020539, SAM-HYM-C020546); Josephskraal, 33.04287° S, 20.7193° E, 900 m a.s.l., 16 Apr. 2008, Koedoesberge-Moordenaars Karoo, Karoo plain slightly N-facing, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C020436); Die Hell, Synamn Hut, 33°21'49" S, 21°37'39" E, 25 Oct. 2005, A. MacArthur leg. (SAM-HYM-C019522); Namakwa Sands, 31°16'14.1" S, 17°56'23.7" E, 31 Mar.–4 Apr. 2003, natural vegetation, Strandveld, pitfall traps, N. Ndivhuwo leg. (SAM-HYM-C018093, SAM-HYM-C018097). – **Eastern Cape:** Willowmore, 1 Jan. 1914, Rhodesia Museum (SAM-HYM-C004017); Willowmore, Oct. 1912, Dr H. Brauns leg. (SAM-HYM-C004018); 16 km N of Willowmore on Brakfontein Farm, 33°09' S, 23°26' E, sand, Karoo scrub, nesting on ground partly under rock, 5 Sep. 1988, H.G. Robertson leg. (SAM-HYM-C005328); Aberdeen, 27 May 1987, A.J. Prins and A. Roux leg. (SAM-HYM-C001686); Vanrhyns Pass, 24 Aug. 1963 (SAM-HYM-C004122); Brandkop, 22 Apr. 1963 (SAM-HYM-C004124); Blomplaas, 60 km SE of Aberdeen, 32°52' S, 23°40' E, 5 Sep. 1988, bare ground on Karoo scrub, nesting underground, H.G. Robertson leg. (SAM-HYM-C001317); 16 km N of Willowmore on Brakfontein Farm, 33°09' S, 23°26' E, 5 Sep. 1988, sand, Karoo scrub, nest partly under rock, partly underground, H.G. Robertson leg. (SAM-HYM-C001311).

NAMIBIA: 61.2 km S of Gobabis on C20, at intersection of C20 and D1790, 23°44.908' S, 18°50.987' E, 1246 m a.s.l., nesting in deep red-orange sandy soils, nest with a crater of soil around entrance, 17 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027005); 31 km NW of Henties Bay on C35, 21°55.433' S, 14°25.164' E, nesting in loose gravelly soil, entrance in open, 9 Apr. 2011, N. Mbanyana



and H.G. Robertson leg. (SAM-HYM-C027007); Klein-Aus-Vista, 26°39.221' S, 16°14.532' E, 1325 m a.s.l., rocky N-facing slope with low shrubs and grass, soil shallow and gravelly, 5 Apr. 2011, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027009); 157 km from Gobabis on C20, 23°44.908' S, 18°50.987' E, 17 Apr. 2011, entrance with crater of soil around, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C027011); Klein-Aus Vista, 26°39.198' S, 16°14.542' E, 1273 m a.s.l., 3 Apr. 2011, nest in rocky sand soil at base of dead grass tuft in middle of dry riverbed, entrance with crater of soil around it (SAM-HYM-C026892, SAM-HYM-C027012); Klein-Aus Vista, 26°39.143' S, 16°14.546' E, 1316 m a.s.l., 4 Apr. 2011, nest in rocky sands, with about four entrances closer to each other with crater of soil around entrance (SAM-HYM-C027015); Marienfluss, Koakoveld, 17°23'38.4" S, 12°29'59.2" E, 15 Oct. 2008, M. Picker leg. (SAM-HYM-C023244); Kakamas, Orange River, National Museum of South Rhodesia leg. (SAM-HYM-C004019); Marienfluss, Koakoveld, 17°23'38.4" S, 12°29'59.2" E, 15 Oct. 2008, M. Picker leg. (SAM-HYM-C027002); Gamsberg, 29.22153° S, 18.97953° E, 929 m a.s.l., 15 Dec. 2007, P. Hawkes and J. Fisher leg. (SAM-HYM-C024382); Diamond Area 1, 27°17' S, 15°58' E, 2–3 Nov. 1986, pitfall traps, E. Griffin leg. (SAM-HYM-C027111); Keetmanshoop District, Khabus 146, 26°18' S, 18°13' E, on sandy plain next to dry riverbed, 14 Apr.–30 Jun. 1988, N. and G. Olivier leg. (SAM-HYM-C027177); Keetmanshoop District, Khabus 146, 26°17' S, 18°14' E, on dolerite hill, E slope, pitfall traps, 23 Jul.–1 Oct. 1988, N. and G. Olivier leg. (SAM-HYM-C027180); Diamond Area 1, 28°12' S, 16°49' E, 14–29 Sep. 1994, pitfall traps, E. Marais leg. (SAM-HYM-C027182); Klein Aus 10, Luderitz District, 26°38' S, 16°10' E, 12–26 Nov. 1993, E. Marais leg. (SAM-HYM-C027185); Keetmanshoop District, Khabus 146, 26°18' S, 18°13' E, on sandy plain next to riverbed, 14 Mar.–14 Apr. 1988, N. and G. Olivier leg. (SAM-HYM-C027186, SAM-HYM-C027187); Diamond Area 1, 28°14' S, 16°39' E, 25–29 Sep. 1994, E. Marais leg. (SAM-HYM-C027189); Sendelingsdrift, Diamond Area 1, 28°07' S, 16°50' E, 14–29 Sep. 1994, E. Marais leg. (SAM-HYM-C027190); Askham and Vansylsrus, 27.03322° S, 21.09746° E, 872 m a.s.l., nest with crater of soil around entrance, 18 Dec. 2007, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C024392); Uniab Delta, 20.11° S, 13.12° E, collected from nest, 9 Apr. 1987, J. Irish leg. (SAM-HYM-C001053); 40 km W of Aus Desert, 26°34.7' S, 15°53.6' E, 25 Nov. 1997, M. and B. Uhlig leg. (SAM-HYM-C011357); 9 mi. NW of Grunau, 4 May 1958, E.S. Ross and R.E. Leech leg. (CASC: CASENT0280906).

### Measurements (worker N=47)

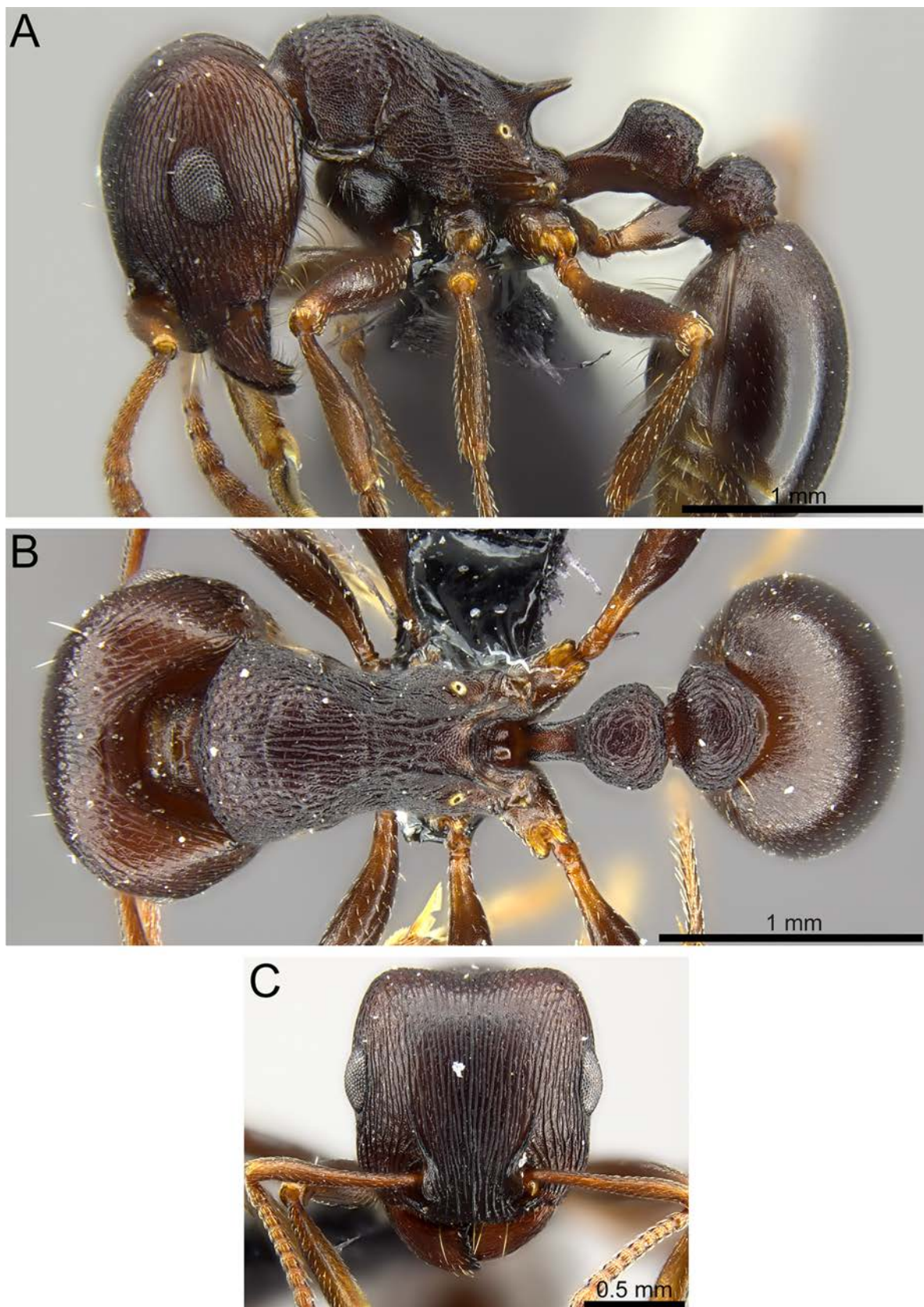
HL 0.885–1.249 (1.092); HW 0.875–1.219 (1.053); SL 0.708–0.934 (0.808); EL 0.266–0.344 (0.308); PH 0.393–0.590 (0.488); PW 0.570–0.816 (0.695); WL 0.944–1.328 (1.139); PS� 0.079–0.246 (0.179); PTH 0.285–0.438 (0.348); PTL 0.246–0.384 (0.319); PTW 0.275–0.471 (0.356); PPH 0.295–0.482 (0.377); PPL 0.226–0.334 (0.279); PPW 0.315–0.610 (0.437); OI 25–33 (29); CI 90–105 (96); SI 71–82 (77); DMI 55–81 (61); LMI 35–57 (43); PS�I 7–21 (16); PeNI 45–58 (51); LPeI 80–108 (92); DPeI 93–124 (112); PpNI 51–75 (63); LPpI 62–97 (74); DPpI 128–200 (157); PPI 106–132 (123).

### Distribution

Known from South Africa and Namibia.

### Remarks

The material examined matched mostly Bolton's description, but a number of differences were noted. Interestingly, the colour variation in this species is explained by geographical distribution. It looks like there are two forms, the Karoo form and the Kalahari sand form. The specimens collected in the Karoo region mainly in South Africa are brown to black. The specimens collected from red sand dunes (Northern Cape, i.e., Dreghorn and Cullinan Farm, and parts of southern Namibia) are reddish. There is also variation in sculpture pattern. In black coloured specimens, the mesosoma has a strong irregular sculpture on the pronotum and short longitudinal striations on the mesonotum with a punctulate sculpture in between. The nodes have a punctulate sculpture overlain by irregular striations. The first gastral tergite



**Fig. 22.** *Tetramorium signatum* Emery, 1895 (SAM-HYM-C020573). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

is punctulate or shagreened at the base. Most of the reddish specimens have a strong, irregular sculpture on the pronotum and short longitudinal striations on the mesonotum with a punctulate sculpture in between. In a few specimens, the nodes are predominantly smooth with only reticulate sculpture. The spine length varies in all forms from medium, which are broad at the base, to very short. Based on that high degree of morphological variation, there is a possibility that there is more than one species within both *T. signatum* and *T. rufescens*. Nevertheless, this can only be properly addressed within a molecular phylogenetic framework, which is outside the scope of this study. We are hopeful to resolve this question in a future study addressing the evolutionary and biogeographical history of this group. This species has been recorded from South Africa (Eastern Cape, Western Cape and Northern Cape) and Namibia. It has been recorded from the following ecoregions: Albany Thickets, Kalahari Xeric Savanna, Kaokoveld Desert, Knysna-Amatole Montane Forests, Montane Fynbos and Renosterveld, Nama Karoo (including Koedoesberge-Moordenaars Karoo), Namib Desert, Namibian Savanna Woodlands and Succulent Karoo. This species nests in sandy to loamy soils, entrances sometimes with crater of soil around them. Alates were collected from nests in December. Two nests were found with Thysanura inquilines. This species has been collected by digging up nests and also from pitfall traps, yellow pan traps, tuna baits, sugar baits and cookie baits.

***Tetramorium solidum* Emery, 1886**

Figs 2I, 4K, 23–24

*Tetramorium solidum* Emery, 1886: 362 (included in Bolton 1980: 252).

**Diagnosis**

In the *T. solidum*-group, only *T. solidum* and *T. aisha* sp. nov. have sparse hairs that are restricted to the mesosoma and the petiole; other species in this group either have abundant hairs covering the whole body or lack erect hairs. *Tetramorium solidum* has very long and acute propodeal spines (PSLI 17–20) (Fig. 4K), whereas the propodeal spines in *T. aisha* sp. nov. are very short (PSLI 5–9) (Fig. 4L).

**Unexamined type material**

**Syntypes**

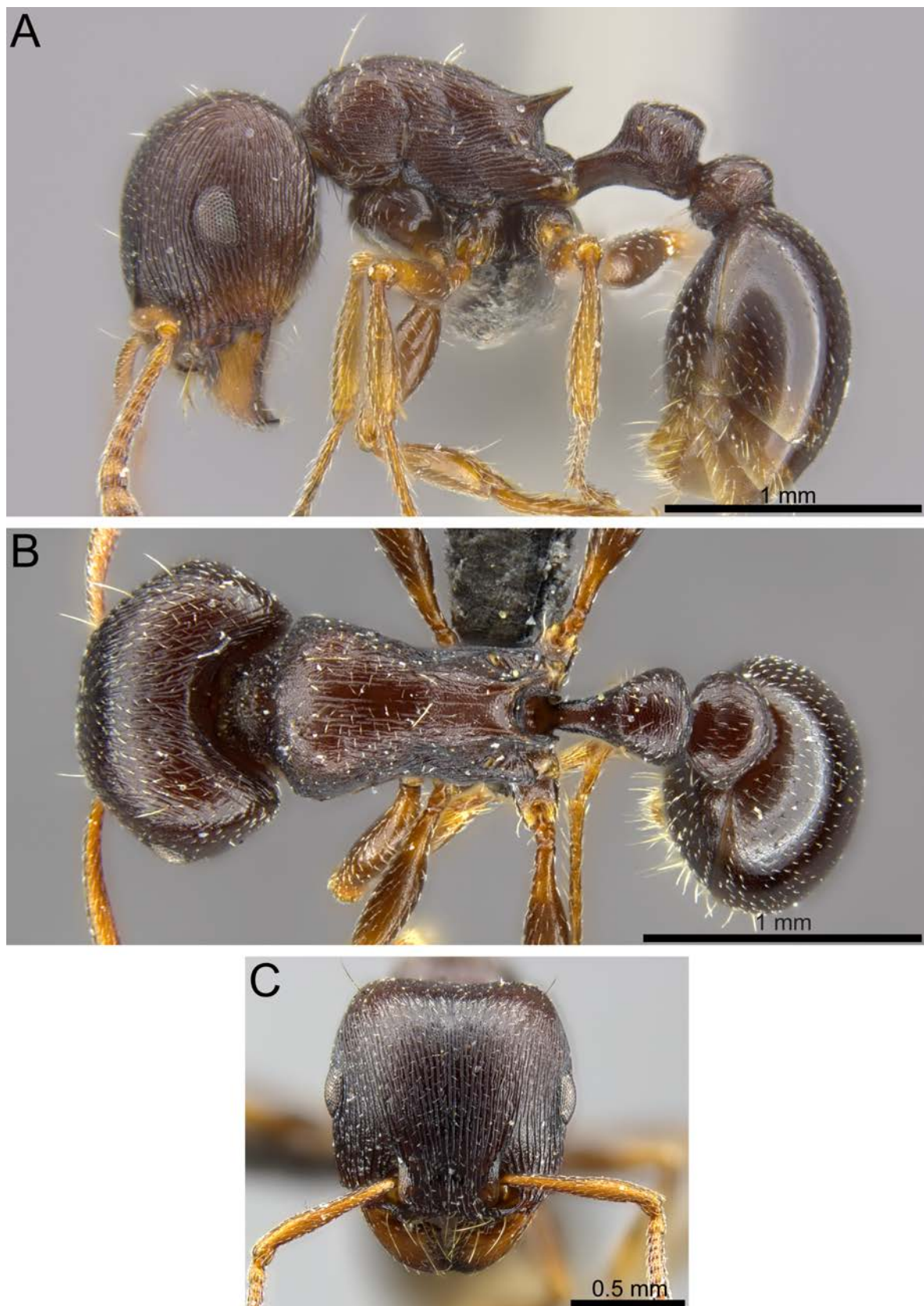
SOUTH AFRICA: pinned workers, Cape of Good Hope, L. Peringueyi leg. (MHNG: CASENT0904840; RMCA).

**Material examined**

**Other material**

SOUTH AFRICA (121 workers): **Northern Cape:** Tankwa Karoo National Park, 32.24758° S, 20.09660° E, 490 m a.s.l., 7 Jan. 2009, N. Mbanyana and H.G. Robertson leg. (SAM-HYM-C023312). – **Western Cape:** Anyskop Farm, 4 km 270° W of Langebaanweg, 32°58.611' S, 18°06.976' E, 18–25 Sep. 2002, yellow pan traps, Fynbos on limestone, S. van Noort leg. (SAM-HYM-C018836); West Coast Fossil Park, 3 km 280° W of Langebaanweg, 32°58.098' S, 18°07.244' E, 4–11 Sep. 2002, pitfall traps, rehabilitated mine dump, S. van Noort leg. (SAM-HYM-C018823); West Coast Fossil Park, 3 km 280° W of Langebaanweg, 32°58.020' S, 18°07.285' E, 4–11 Sep. 2002, pitfall traps, rehabilitated mine dump (SAM-HYM-C018830); West Coast Fossil Park, 4 km 290° E of Langebaanweg, 32°57.512' S, 18°06.728' E, 4–11 Sep. 2002, pitfall traps, rehabilitated mine dump, S. van Noort leg. (SAM-HYM-C018824); Helshoogte Valley outside Stellenbosch, 33°55' S, 18°54' E, 22–23 Mar. 1996, P.J. Pieterse leg. (SAM-HYM-C008817); Lorraine Farm, 32°04' S, 19°03' E, five open nest entrances with crates of sand round them, 9 Sep. 1996 (SAM-HYM-C008986); Jacobsbaai, 32°58' S, 17°54' E, 16 Feb. 1966, A.J. Prins leg. (SAM-HYM-C007491); 6 mi. from Saldanha Bay to Jacobsbaai, Long





**Fig. 23.** *Tetramorium solidum* Emery, 1886 (CASENT0250960). **A.** Body in profile. **B.** Body in dorsal view. **C.** Head in full-face view.

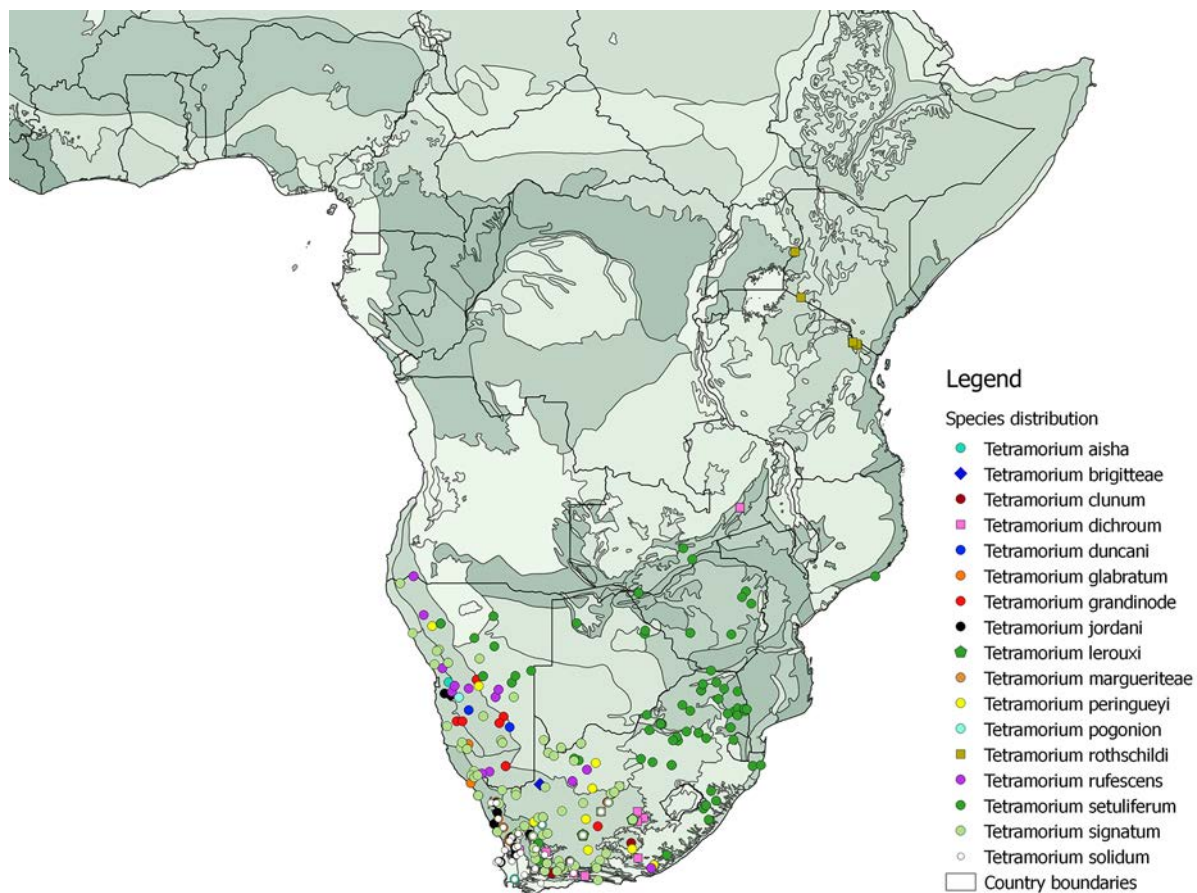
Point, 32°59' S, 17°53' E, 9 Jan. 1963, A.J. Prins leg. (SAM-HYM-C007496); Sevilla Rock Art Trail, 32.0797° S, 19.08828° E, 329 m a.s.l., 10 Sep. 2009, P. Hawkes and J. Fisher leg. (SAM-HYM-C024393); jeep tract between Welbedacht and Sneekop Hut Site 1, Cedarberg Wilderness Area, Wupperthal, 32.45515° S, 19.235033° E, 1187 m a.s.l., Fynbos pitfall trap, 5 Mar. 2003, A. Botes leg. (SAM-HYM-C024975); Sneekop, A. Andersen leg. (CASC: CASENT0248478); foragers, 5 km S of Lamberts Bay, 32.41603° S, 18.30696° E, 10 m a.s.l., West Coast Strandveld, on ground, 30 Sep. 2011, B.L. Fisher leg. (CASC: CASENT0264029, CASENT0264031); Clanwilliam, Sevilla Rock Art Trail, 32.07973° S, 19.08828° E, 329 m a.s.l., Cedarberg Sandstone Fynbos, hand collected, 8 Sep. 2009, P. Hawkes and J. Fisher leg. (CASC: CASENT0250960); Berg River, 4 mi. S of Piketberg, 150 m a.s.l., 30 Apr. 1958, E.S. Ross and R.E. Leech leg. (CASC: CASENT0217978, CASENT0270797 to CASENT0270799).

### Measurements (worker N=13)

HL 0.905–1.076 (1.004); HW 0.905–1.151 (1.026); SL 0.669–0.831 (0.755); EL 0.207–0.275 (0.242); PH 0.452–0.580 (0.523); PW 0.575–0.698 (0.647); WL 0.964–1.153 (1.081); PSL 0.177–0.197 (0.188); PTH 0.295–0.374 (0.345); PTL 0.256–0.315 (0.290); PTW 0.305–0.396 (0.346); PPH 0.295–0.384 (0.363); PPL 0.246–0.325 (0.277); PPW 0.379–0.482 (0.432); OI 22–24 (24); CI 95–106 (102); SI 70–81 (74); DMI 56–61 (60); LMI 44–51 (48); PSLI 17–20 (19); PeNI 50–57 (53); LPeI 77–89 (84); DPeI 110–126 (119); PpNI 65–70 (67); LPpI 64–85 (76); DPpI 145–184 (157); PPI 119–134 (125).

### Distribution

Only known from South Africa.



**Fig. 24.** Map showing the distribution of species in the *Tetramorium solidum* group.

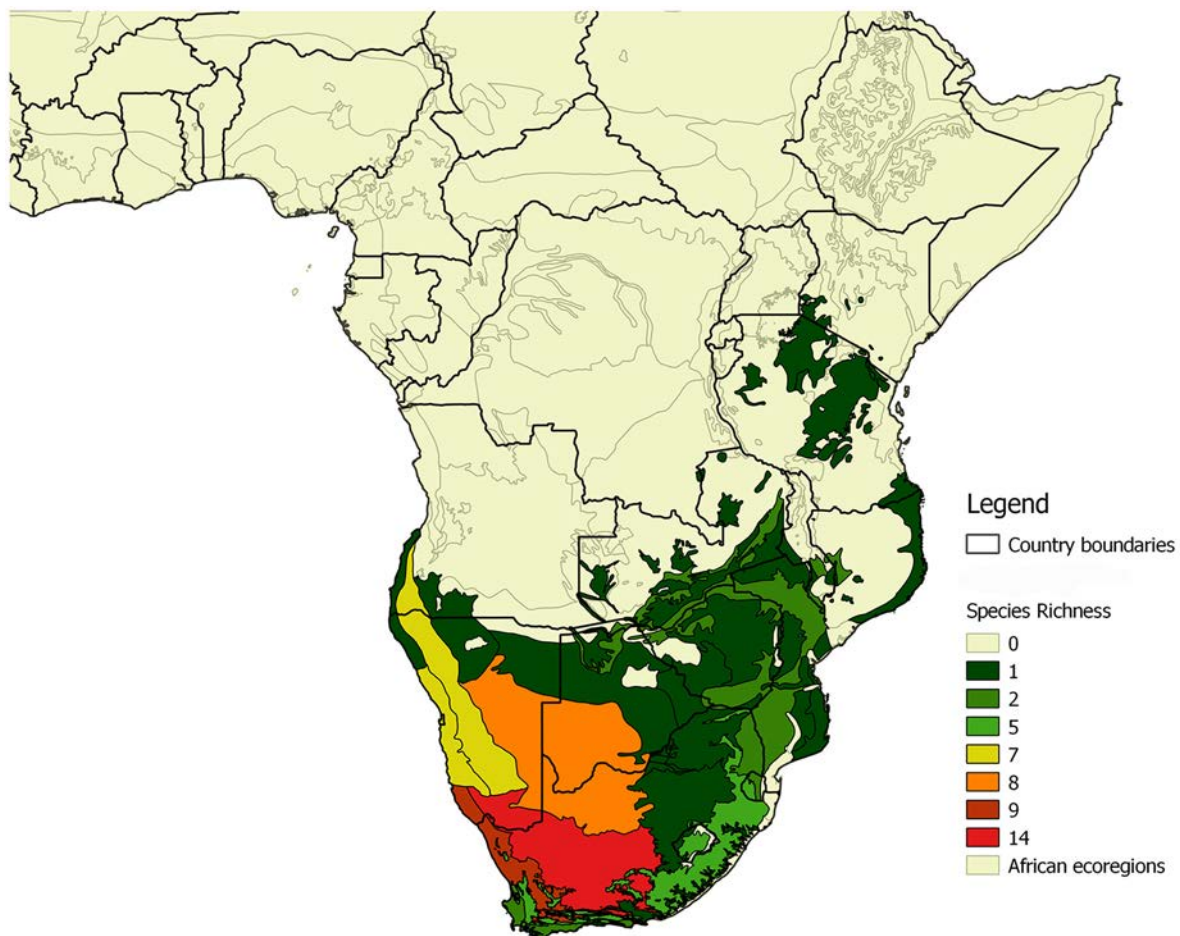


## Remarks

*Tetramorium solidum* has been collected in Strandveld, Succulent Karoo, Fynbos and in transformed lands on tillite shales. This species has been recorded only in the Montane Fynbos and Renosterveld, Nama Karoo and Succulent Karoo; found nesting in clays soils, with craters of soil around nest entrances. Queens of this species were collected in April and males were collected in September from the nests. Seed stores have been found in nests. This species has been collected either by digging up nests or from pitfall traps and yellow pan traps.

## Discussion

The highest diversity of species in the *Tetramorium solidum* group is concentrated in the Nama Karoo with 14 species recorded from this region (Figs 24–25). Nine species were recorded from the Succulent Karoo region, which is considered to be a major biodiversity hotspot (Myers *et al.* 2000). Members of *T. solidum* group appear to be arid-adapted and their distribution closely reflects current rainfall patterns in Africa. Most of the species in this group occur in the southwestern parts of the Afrotropical region (Fig. 25), where there is less rainfall, avoiding the moist grassland, savannah, woodland, and forest vegetation types in the east. The western region of southern Africa experiences an annual rainfall of about 100 mm to nearly 500 mm per annum (Venter *et al.* 1986). In addition, at least eight species were recorded from Kalahari Xeric Savanna and seven from the extreme dry regions of Namibia. Soil might



**Fig. 25.** Map showing the diversity of the *T. solidum* group across the different ecoregions of southern Africa. Numbers in the legend indicate number of species.



also be influencing the distribution of these species. *Tetramorium jordani* is restricted to loose sandy areas and *T. solidum* extends more into the clay soils. *Tetramorium rothschildi* is the only species in the *T. solidum* group with branched hairs and the only species that has an equatorial distribution. We are not convinced that *T. rothschildi* is a genuine member of the group and hope that a currently ongoing molecular phylogenetic analysis will resolve the true relationship of *T. rothschildi*.

Defining species in the *T. solidum* group based on morphology alone is very challenging due to the intraspecific variation in most species. High levels of intraspecific variation in *T. signatum* and *T. rufescens* may indicate the presence of several cryptic species. The issue of cryptic species is prevalent in many taxa (e.g., Bickford *et al.* 2007; Molino *et al.* 2011; Crespo & Lumbsch 2010) including ants (Seifert 2009; Schlick-Steiner *et al.* 2006).

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